FORM+TEST
PRÜFSYSTEME

Operating Manual for Testing Machine

ALPHA 3-3000

DELTA 5-200

B A

Deckblatt extern-e.ofm - 1.1 - 10/2004

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Manufacturer's data

Testing machine	ALPHA 3-3000
Serial number	02643
Order number	07/1285
Year of construct.	2007

B A

Manufacturer

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The operator has to take the respective safety precautions!

Printed in Germany

Manufacturer's data

Testing machine	DELTA 5-200
Serial number	41000
Order number	07/1285
Year of construct.	2007

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Manufacturer

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Foreword

FORM+TEST PRÜFSYSTEME

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This document facilitates to get to know your testing machine resp. your testing system (briefly called: machine) and its capabilities.

The operating manual contains important information for a safe, proper and economical operation of the machine. The observance helps to avoid any risks, to reduce repair costs and downtimes and to increase the reliability and life expectancy of the machine.

This operating manual must be permanently available at the site of operation.

The operation manual has to be read and followed by any person who has to carry out works with/at this machine, e.g.

- Operation, incl. preparation, trouble shooting in the operating cycle, waste disposal, etc.
- Maintenance (servicing, inspection, repair) and/or
- Transport

Besides the operating manual and the currently valid safety regulations of the user's country you have to observe the accepted technical rules for safe and professional working, too.

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Designated Use

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The machine is designed for static loading with statical or dynamic course. It is designed for compression, bending or tensile tests.

For a designated use of the machine the operating manual and the inspection and maintenance instructions have to be followed. The operating manual is a part of the machine and must therefore be permanently available at the site of operation.

An extension of the field of application for the machine or its components results in a change of the designated use. The resulting additional risks have to be avoided by your adequate safety precautions.

Duty to Exercise Diligence

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The machine has been constructed considering a danger analysis and after careful selection of the harmonized standards to be used and of further technical specifications. The machine corresponds to the safety requirements of the machinery directive of the E.C. and thus it corresponds to the state of the art. The used standards and directives are mentioned in the „Conformity Certificate“ or in the „Manufacturer’s Declaration”.

The safety of the machine, however, can be put into practice only if all necessary measures are taken. So the user of the machine has the duty to plan these measures and to control their carrying out.

The user of the machine must guarantee that

- the machine is only used **as directed**
- only **safe** tests are performed
- the machine is operated only **in perfect and working order**
- **protection devices are not manipulated or removed**
- the functioning of safety devices (limit switch, proximity switch, emergency stop, etc.) is checked weekly
- **the machine is immediately stopped in case of malfunction** and that the defect is repaired without any delay
- **the operating manual** is permanently and completely available at the site of operation
- **danger signs** which are fixed on the machine **are not removed and that they are kept legibly.**
- only **qualified and authorized staff** operates, maintains and repairs the machine
- this staff is regularly instructed in **industrial safety precautions and environmental care.** Moreover the staff has to read the operating manual and has to respect the safety notes
- the staff wears **appropriate safety clothes**

Operating Staff

Please ensure that only qualified or trained staff operates the machine. These persons have to know the possible risks of the machine.

You should clearly define the responsibility of your staff for

- the operation of the machine
- the preparation of the test
- the maintenance
- the repair.

Works on electric components, e.g. during the installation, have to be done – in compliance with the electrotechnial rules - only by

- an electrician
- or trained persons under direction and supervision of an electrician.

Works on hydraulic components should be done only by

- persons with special knowledge and know-how in hydraulics.

During the running the working place of the operating staff is in front of the machine. A working beside or behind the machine can be necessary for installation or maintenance purposes.

The following danger signs can be attached to the machine and its accessories. Please note!

Danger of injuring oneself!

This component moves. Caution ! No automatic switch-off in case of contact!

Danger of bruise !

This component can be closed mechanically, manually or automatically. Caution! No automatic switch-off in case of contact!

Danger of burn or frostbite!

These components can be or get very hot resp. cold!

Signal Words in the Operating Manual

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In the operating manual we have marked the functions which may have any risk for the operator or the machine with the below mentioned signal words. Only skilled staff is allowed to carry out these functions carefully.

DANGER

Immediate threat, which can lead to serious injuries or death.

WARNING

Possibly dangerous situation which can lead to minor injuries .

CAUTION

Possibly dangerous situation which can damage the machine or an object in its direct surrounding.

The most important aim of these safety signs is to avoid any bodily injury.

Safety signs with the title „DANGER“ or „WARNING“ may contain risks for machines, accessories and the environment, too.

Before starting

Before starting the machine please check and ensure that

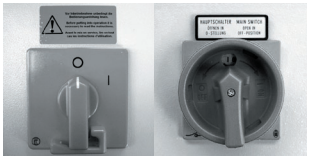
- only authorized staff is in the working range of the machine
- nobody can be injured by starting the machine
- all protection devices are available!

Before the starting please also check if there are any damages/ defects at the machine. If so, please immediately inform your superior.

During the operation

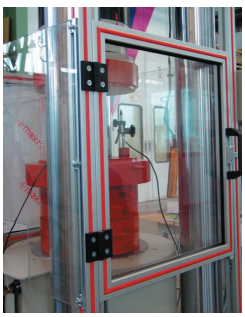
Before the starting inform yourself about the correct behaviour in case of trouble.

Emergency Stop



In case of any danger you can immediately stop the testing machine by using the emergency stop (depending on the version of the machine either by pressing the read emergency stop push button or by turning the read emergency stop switch).

Protective devices



Please always use protection devices, especially when testing

- specimens with high absorption of energy and deformation as springs, ropes, belts
- specimens which splinter in case of break
- with a high speed of piston or crosshead
- by using of hardened or ceramic clamping jaws

Clamping tools hydraulic / pneumatic

Do not put your hands between the clamping jaws! Please always use a pair of tongs for placing the specimens.

Danger of injuring oneself!

Never open clamping tools which are under pressure / tension! Danger of injuring and damage! Before opening the tools the clamped specimen has to be completely relieved of load. Never work on the test chamber when the machine is running.

Danger of getting your fingers caught!

Do never test specimens which are not correctly clamped or placed!

Parts of the machine, e.g. the motor, can get very hot. In case of an existing tempering unit, even external parts can get very hot or very cold. Therefore touch these parts only by using protective gloves!

In case of any installation or conversion works please proceed very carefully and prudently. Never put any objects in the test chamber or on the testing tools!

The noise of the breaking specimen can cause hearing defects. Therefore use ear muffs!

Maintenance

During the maintenance of the machine please observe the following points in order to avoid serious injuries or machine damages:

- Keep to the specified service and maintenance intervals!
- Observe the maintenance instructions!
- Do only use the indicated lubricants!
- Do only use spare parts in accordance to the enclosed spare parts list!

Before maintenance or repair:

- switch off the power switch in order to interrupt the power supply and secure it against unintentional reactivation by means of a padlock
- pull the mains plug or disconnect the mains connection
- wait until all parts of the machine which possibly have to be touched (e.g. the motor) have cooled down to room temperature!

Before starting the machine after maintenance or repair works please check if:

- all screwed connections have been screwed on again
- removed covers, strainers or filters have been installed again
- all materials and tools, which are required for maintenance or repair, have been removed from the working range of the machine
- possibly escaped liquids have been removed
- all protective devices of the machine are well-functioning.

Only if all these works have been effected correctly and without any fault, the machine can be started again.

If heavy machine parts have to be exchanged, only use suitable and perfect load carrying attachments and sling gears!

Works on the electrical equipment

If an electrical connection is designated the testing machine or the control console has to be connected only by an authorized expert. Pay attention to the correct system voltage!

Only skilled and qualified personnel are allowed to maintain or repair electrical equipment!

- Check the electrical equipment regularly!
- Fix again loose connections !
- Exchange damaged lines / cables without any delay!
- Keep the control cabinet always closed! Access is permitted only authorized persons with key / tools.
- Never steamclean control cabinets and other housings of electrical equipment (e.g. motors)! Never clean them by using a water hose!

Works on hydraulic or pneumatic equipment

Only persons with special know-how and knowledge of hydraulics are allowed to maintain or repair hydraulic or pneumatic equipment!

- Before maintenance or repair works the pneumatic and hydraulic equipment of the machine has to be made pressureless!
- Regularly check all lines, hoses and screwings concerning leakage or externally recognizable defects!
- Immediately repair any defects!
- Squirting-out oil can lead to injuries or fire!
- Hose lines should be exchanged regularly, after 6 years at the latest (resp. according to specifications of manufacturer), even if no damages are recognizable!
- Remove flown-out hydraulic oil at once! Slippery!
- Lay and mount hydraulic lines and compressed-air lines workmanlike.
- Pay attention to the correct connections!

Instructions for Environmental Care

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The legal duties of waste avoidance, waste disposal and recycling have to be fulfilled while working on or with the machine!

Especially while installation, repair or maintenance works water endangering materials like for example

- grease or lubricating oils
- hydraulic oils
- coolants
- cleaning agents containing solvents

are not allowed to pollute the soil or to get to the sewage system!

These materials have to be stored, transported, collected and disposed of in suitable containers!

Exchange parts have to be disposed of in an environment-friendly and safe way!

If hydraulic oil has possibly escaped from the machine, please absolutely take care that it does not get to the soil or to the sewage system!

IMPORTANT

It is important that the machine is installed in a room with a room temperature between + 16°C and +20°C in order to get exact test results.

If the piston stroke is not sufficient, you can get the required test chamber height as follows:

- Insert distance pieces, namely put them centrically on the lower pressure plate. Only distance pieces with a hardened and ground contact surface have to be used.
- If you have a testing machine with adjustable test chamber height, the upper pressure plate has to be brought to the specimen up to 10 mm.
- Put the specimen exactly centrically on the lower pressure plate or the distance piece. For this use the centering marks or a measuring tape.

ATTENTION

With all testing machines you have to pay attention to the piston stroke indicated in the technical data, i.e. after having reached the maximum piston stroke the machine is not allowed to be charged anymore!

De-aeration of the pressure line

If, contrary to all expectations, air has got in the line between pump and pressure cylinder (the piston extends jerkily), it can be removed as follows:

- Carefully unscrew the swivel nut of the pressure line at the cylinder.
- Switch on the hydraulic power unit, set it at „pressure increase“ until oil comes out of the swivel nut. Then strongly tighten the swivel nut again.
- Check the oil-level and – if necessary – add oil.

Maintenance Recommendation

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At delivery the oil tank is filled with the required hydraulic oil.

We recommend an oil change every two years.

The oil change has to be effected as follows:

- See to it that the machine's piston is in its final position.
- At the hydraulic power unit the oil drain plug is located at the lower edge of the oil tank. This drain plug has to be removed and the oil has to be collected in a suitable container. Then fix the oil drain plug again.
- Open the filling nozzle on the tank cover and fill in the new oil by using a funnel. Then close the filling nozzle.

The oil level has to be checked monthly! Please only use blister-free and acid-free hydraulic oil (see "our recommendation for lubricants" on the next page).

Our machines are filled with: OEST / HLP 68.

Every two weeks you have to do the following:

- Visual control of the screw connections. If a screw has loosened please contact us concerning the tightening torque!

Recommendation for Lubricants

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We recommend the use of the following lubricants:

AGIP	OSO 68
ARAL	VITAMGF 68 VITAMDE 68
BP	ENERGOL HLP 68 HLP 46S
CHEVRON	AW - HYDRAULIKOIL 68 MECHANISM LPS 68
ESSO	NUTH H 68 UNIVIS N 68
MOBILOIL	DTE 16 DTE 26
OEST	HLP 68
SHELL	TELLUS OEL 68 HYDROL DO 68
TEXACO	RANDO OIL HDC - 68 RANDO OIL HCCZ - 68

Checkup and Acceptance of the Delivery

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IN

The consignment has to be checked concerning external damages immediately on receipt. If the packing is in proper condition, you can accept the goods.

Check the completeness of the consignment by means of the delivery note.

If it is feared that a transport damage has happened, immediately make a record. The external damage has to be confirmed in writing by the carrier. The extent of damage should be described on the bill of lading or any other document as exactly as possible. In case of doubt do not accept the consignment.

If a transport damage comes to light after the acceptance, the carrier has to be informed without any delay. A record should be made on the spot, either in the carrier's or his representative's presence. The record has to be signed by the carrier resp. his representative. Please do not make any modifications before the record has been made!

Then inform us about the extent of damage. This information must be as exact as possible. It has to enable us to judge if the damage can be repaired by sending spare parts, if a visit of our technician is necessary or if the machine has to be returned to our factory.

Transport of the Machine

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IN

For the transport of the machine only eye bolts type Starpoint VRS of the manufacturer RUD or equivalent products of other manufacturers should be used.

- The delivered packing should be removed only at the place of installation
- The machine should be protected from any shocks
- No use of brute force
- Do not apply the lever to sensitive machine parts
- Consider the centre of gravity

Installation of the Machine

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IN

The machine has to be installed horizontally on a solid foundation and – if necessary - it has to be fixed by means of screws.

After the installation the space between machine's foot and floor has to be casted.

If you have received a control console for the drive of the testing machine you have to make the connection between control console and machine by means of the delivered hydraulic hose (or line).

It is important that the machine is installed in a room with a room temperature between + 16°C and +20°C in order to get exact test results.

De-aeration of the pressure line

If, contrary to all expectations, air has got in the line between pump and pressure cylinder (the piston extends jerkily), it can be removed as follows:

- Carefully unscrew the swivel nut of the pressure line at the cylinder
- Switch on the hydraulic power unit, set it at "pressure increase" until oil comes out of the swivel nut. Then strongly tighten the swivel nut again.
- Check the oil-level and – if necessary – add oil.

How to Rinse Out the Hydraulic System

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IN

If the machine has been delivered with a separate hydraulic power unit, it is essential to rinse out the hydraulic system after the installation and before the commissioning.

Normally this has to be done by one of our service technicians. If, however, you want to do it on your own, please absolutely contact our service department.

Sense of the Pump Motor

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IN

ACHTUNG

- Auf Drehrichtung des Pumpenmotors achten!
- Motor muss in Pfeilrichtung drehen!
- Gegebenenfalls Drehrichtung des Motors durch Vertauschen von zwei Phasen ändern!

ATTENTION

- Please pay attention to the sense of the pump motor!
- The motor must rotate in direction of arrow!
- If this is not the case, please change the motor‘s sense of rotation by exchanging two phases!

ATTENTION

- Faites attention au sens de rotation du moteur de la pompe!
- Le moteur doit tourner en direction de la flèche!
- Si ce n‘est pas le cas, il faut changer le sens de rotation du moteur en échangeant deux phases!

Abridged operation manual
DigiMaxx C-20

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C20

- Switch on the machine by actuating the mains switch and then switch on the electronic unit by pressing button POWER.

Selection of the Machine

- Select the desired machine by pressing button MA 0 Now – corresponding to the configuration of the digital display - M1 (up to M4) appears on the screen.
- Switch over the hydraulic reversing valves to the respective machine. In case of machines with a solenoid switching valve the hydraulic and electronic unit are adjusted automatically.

Preparation of the Test

- Press button SET 5.
- By means of buttons ↑ 8 and ↓ 2 you can select the sub-menu Test Ramp.
- Then press ↵ and select Ramp-Cycles.
- By pressing ↵ the menu is opened.
- Enter the following values:

Cycles	0 (no cycles)
Stopping	0,0s
Vel	desired load speed in kN/s
Max	nominal power of the machine
Min	0,0 kN

- The inputs must be confirmed by pressing ↵.
- Then break off with ESC DEL and memorize with DATA. For exiting the menu press ESC DEL twice.
- Now insert the specimen.

Abridged operation manual
DigiMaxx C-20

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C20

Execution of the Test

- If necessary you can change the display N/mm² referred to the specimen's area with button CALC
- Press START. The zero-adjustment is made automatically. The piston extends and the specimen is loaded with the preset value until it breaks. After the break the machine reduces the pressure automatically and the piston returns acc. to the preset sinking time (menu point "sinking time")
  Now the machine is ready for another test..

After pressing START the display is automatically set to zero while the piston is extending. For this the machine needs about 2 seconds time. So please take care that the sinking time is set long enough so that at the next test after pressing START there are at least 2 seconds left until the piston contacts the specimen.

End of the Test

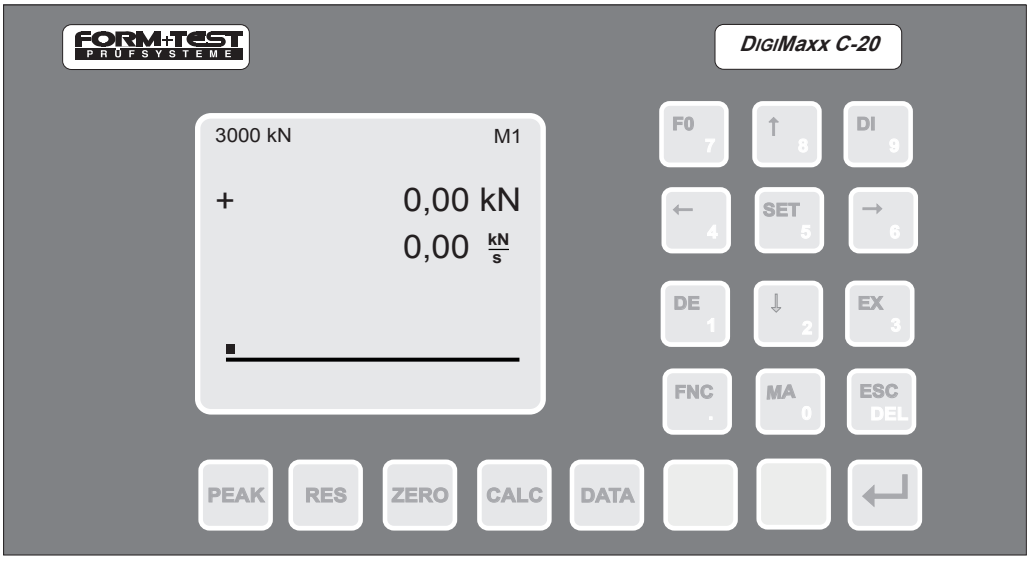
- Switch off the electronic unit by pressing POWER and then switch off the machine by actuating the mains switch.

.

DIGIMAXX C-20

Digital Control Unit

28.10.2002 as/la



Version 7

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- **General view**

Type of device:

Real digital control unit which has been developped for all types of testing machines. Expandable to a fully automatic testing system in connection with balance, sliding caliper, measuring station and computer.

Selection of the machines:

The device is structurally divided in max. 4 machines. All settings can be made separately for each machine.
Exceptions: specimens' configuration and print-out inputs.

Operation:

At first select the respective machine.Then make all settings with the main menu. These settings are being preserved by a memory even after switching-off the device. For the securing of the machine's functions "plant" and "calibration" are code-protected.

Specimens' configuration:

The 30 most frequent types of specimens with dimensions and loading speed can be memorized under menu ''Specimens' configuration''.

Test procedure:

Select the desired specimen's type with push-button CALC and start the machine.

If a specimen is tested which has not yet been programmed you have to input the test course under menu ''ramp''. During the test the screen indicates the load in kN. In case of respective measuring systems an additional displacement or deformation display is possible.

Under ''test'' free-programmable test courses are possible(only valid for C20).

Computer interface

By the serial interface of DIGIMAXX there is a full compatibility to the complete material testing software PROTEUS. Only some possibilities of this testing system are mentioned with the complete operation by computer and the graphical recording during the test.

Memory (option)

This memory allows a testing at the DIGIMAXX and then a subsequent transmission of the specimens' data to the connected computer.

- **Explanations for the keys**

Device on/off	
Peak value measurement on/off	
Peak value reset	
Tare (zero setting / without memory)	
Selection of specimens with strength conversion free-programmable up to specimens 30 (ex works: cube 20 cm, cube 15 cm, prism 16 cm²)	
Change-over of the display from N/mm² to kN when specimen is selected. Initialization of display	
Print command to computer or printer Storage of settings	
Call main menu	
Start test - stop	
Discharge specimen Stop - release sinking time / sinking without time limit	

- **Explanation for the Keys**

In case of double display
Selection of measuring parameters with status line at the sueen.
This applies to the change -over from ZERO to digit selection, etc., too.

F0 = Force

DI = Displacement

DE = Deformation

EX = Extern

Selection of machines (max. 4 machines)

Cursor (menu-control)

Cursor (menu-control)

Cursor (menu-control)

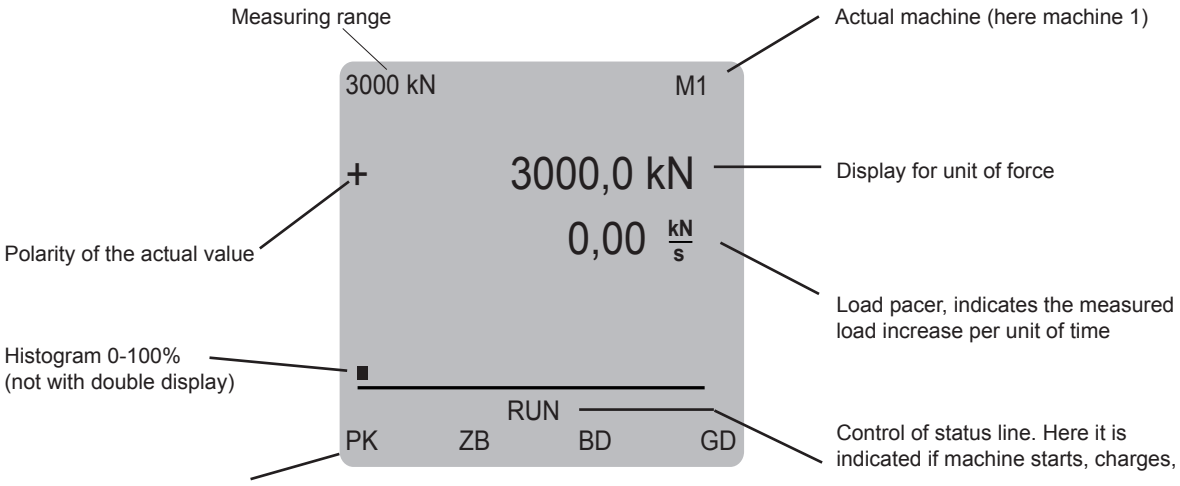
Cursor (menu-control)

Push-button Enter
Paper feed printer / (option)

- **Explanations for the LCD-display**

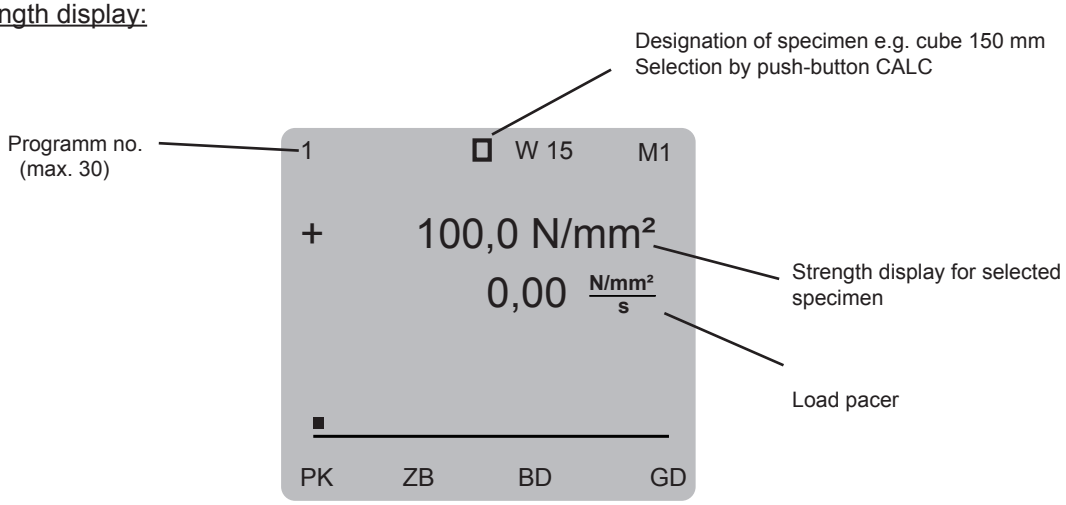
Selection of measuring parameters:

Screen:



Status line for functionsstops, discharges, ...
PK: peak active
ZB: zero band active
BD: break detection active
BR: break detection released
GD: detection of limiting value active
MAX/MIN: Max/Min limiting value released

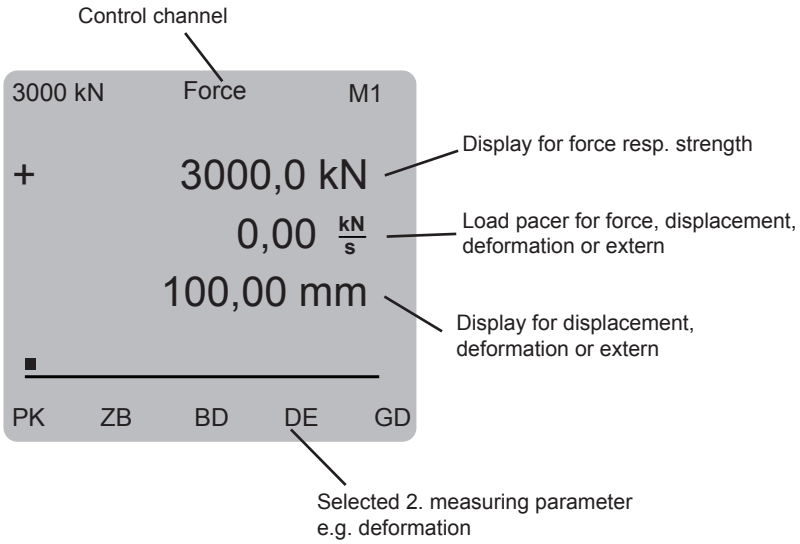
Strength display:



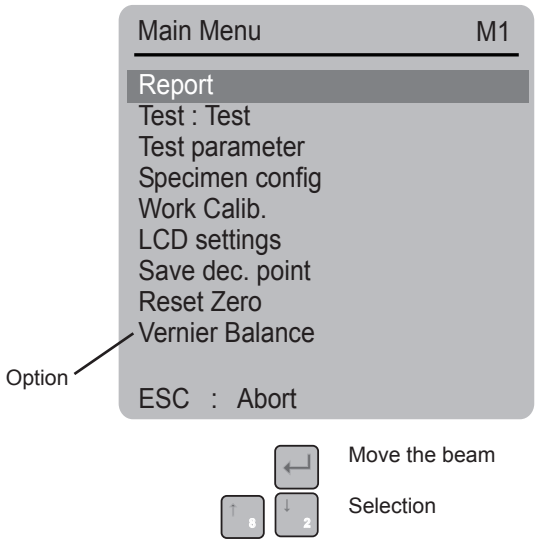
FNC Change-over from strength display to force display without loss of values

- **Explanations for the LCD-Display**

Double display: (Option)



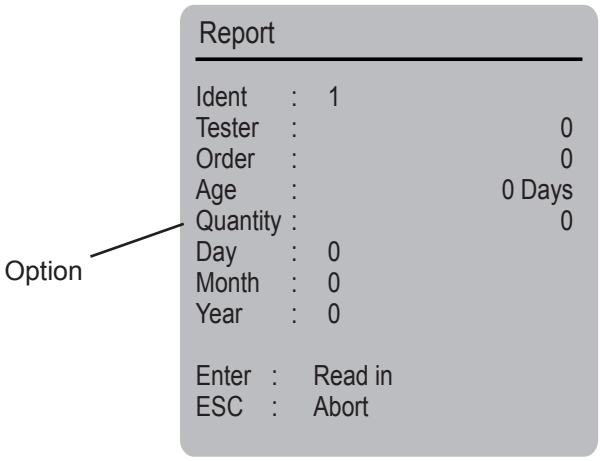
- **Main Menu**



Report:	Setting of print-out data (date, number of specimen) corresponding to type of printer and mode.
Test:	Entry of a freely programmable test sequence according to the equipment of the machine.
Test parameter:	Inhibit resp. release and programming of machine settings and test settings corresponding to the selected options.
Specimen config.:	There are available up to 30 free-programmable (in dimensions and test speed) specimen types as for example cubes, cylinders and prisms.
Work calibration:	Provides menu items protected with a code for calibration and manufacturer's parametarisation of the system. Displays the software version.
LCD settings:	Contrast adjustment and switching off of the screen (standby).
Save dec. point:	Select the display parameter (FO force, DI displacement, DE deformation). With this menu you can store the places after the decimal point of the set parameter (FO,DI,DE).
Reset Zero :	Release of the tare, which has been effected with zero-key. Select the display parameter as described under “Save dec. point”.
Vernier Balance:	Switch on the sliding caliper and/or balance. Selection by MA. (Option)

- **Sub-menu "Report"**

The print-out can be started manually or by the break detection. Date and testing number can be set.



Ident: The testing number can be set up to 9 digits (continued)

Tester: Setting of the laboratory assistant's or tester's number (max. 9 digits)

Order: Setting of order number (max. 9 digits)

Age: Specimen’s age (max. 9 digits)

Day, month, year: The settings for day, month and year have 2 digits. After every input you have to press ENTER. (The date setting is neither stored nor automatically corrected. It must be set daily)

Escape

Printing of the print-out screen

Enter

- **Print command of print-out**

The print-out is automatically started by the break detection.

By pressing the DATA key the print-out can be started manually. Then according to the configuration (sliding caliper, balance) the displayed measuring value, the specimen's number, the type (in case of N/mm² only) and the date are printed.

In case of connected sliding caliper and/or balance the following print-out is made:

Example 1.

BREAK	2610 KN
AGE	28
TESTER	12
ORDER	98123
IDENT	3
DATE	21:01:9

Example 2:
(measuring + weighing)

BREAK	265,42 kN
STRENGTH	11:80N/mm
BULK DENSITY	2228Kg/m
WEIGHT	7520
HEIGHT	150,0mm
WIDTH	150,0mm
LENGTH	150,0mm
AGE	28
CUBE	150,0mm
TESTER	12
ORDER	98123
IDENT	2
DATE	21:01:98

Example 3:
(with option E-Software)

Force average	+ 572.2 kN
Quantity	3
Break3	+ 564.5 kN
Break2	+ 586.1 kN
Break1	+ 566.0 kN
Age	28
Speed.	+ 11.25 kN/s
No.	3
Date	17.03.95

Example 4:
(with option E-software
measuring + weighing)

Bulk dens.aver.	2837 kg/m3
Force aver.	+35.7 N/mm2
Quantity	3
Strength3	+ 35.5 N/mm2
Bulk density	2881 kg/m3
Weight	9620 g
Height	149.0 mm
Width	149.5 mm
Length	149.8 mm
Strength2	+ 35.2 N/mm2
Bulk density	2807 kg/m3
Weight	9536 g
Height	150.5 mm
Width	150.2 mm
Length	150.2 mm
Strength1	+ 36.4 N/mm2
Bulk density	2823 kg/m3
Weight	9498 g
Height	149.9 mm
Width	149.8 mm
Length	149.8 mm
Age	28
Speed	+ 0.05 N/mm2/s
Specimen	W150
No.	1
Date	17.03.95

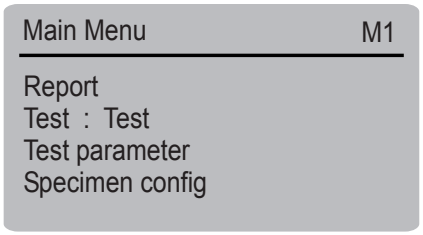
By pressing the ENTER key the paper feed is started.

- **Sub-menu "testing"**

Different test courses are possible: A simple ramp function with cycles, a step program and a program for the E-Module test according to standard.
A free-programmable universal test with smooth change-over is possible as an option.

Operation

1.

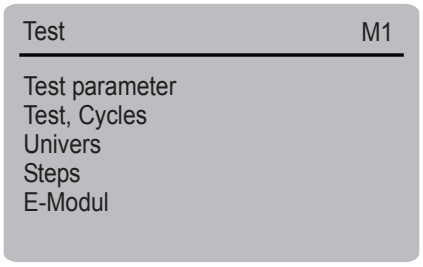


Indication of the test type:
ramp, steps, E-module or universal

selection by key ENTER

By selection of the menu "testing"
the following programming - and selection menu appears:

2.



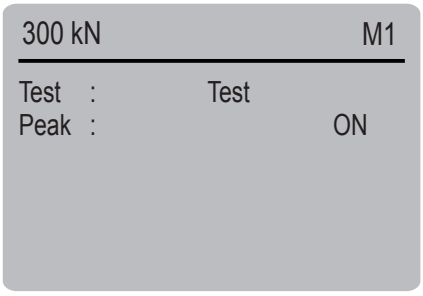
Programming of the test

Selection of the test type under
menu "settings"

selection by key ENTER

By selection of the menu "setting" the following selection screen appears:

3.



selection of the test type.

• External test (Option)

Funktion: · By pressing START the piston extends, the specimen is being charged and the preselected control-parameter is switched on. By pressing STOP the specimen is being discharged again.

Application:
· Calibration of displacement-, deformation- and external channel.
· Tests with external control point and internal control-parameter-connection.

Test Procedure:

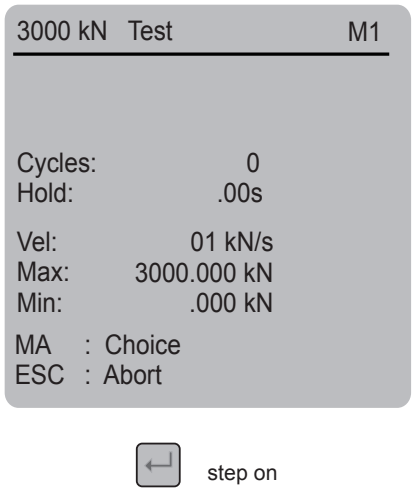
1.Calibration of displacement transducers:

· In the menu “adjustment” set the preload to %.
· In the menu “test” select “external”. With key MA select the control parameter and memorize with ESC/DATA.
· In the menu “test” select “settings”. Select “external” with key MA and memorize with ESC/DATA.
· Press START.
· On treshold the selected control parameter is smoothly adjusted.
· Calibrate the transducers by means of the handwheel or the keys ↑↓.
· Discharge the machine by pressing STOP.
· Restore the treshold.

2. Test with external control point:

· In the menu “test” select “external”. With key MA select the control parameter and memorize with ESC/DATA.
· Select “settings” in the menu “test”. Select “external” with key MA and memorize with ESC/DATA.
· Reset the external control point to 0.000 V.
· Press START.
· On treshold the selected control parameter is smoothly adjusted.
· Run the test with the external control point.
· Discharge the machine by pressing STOP.

- **Sub-menu "Ramp, Cycles"**



The mode “adjustment” allows by means of deformation method a clamping of the tension specimen or the manual extension of the piston to a bending specimen (option).

The selection of the control parameter makes force-, displacement-, deformation and external controlled tests possible. The piston is always extended in such a way that the specimen is touched by the platen (frictional connection), except in case of “adjustment” mode (option for double display).

The cycle input permits repetitions. In case of abortion the last cycle number is indicated. If you input cycle 0 it means that the machine is run to the max. force up to its standstill.

The holding time permits the holding of the maximal and minimal load.

The vel.-input is equivalent to the load increase per unit of time.

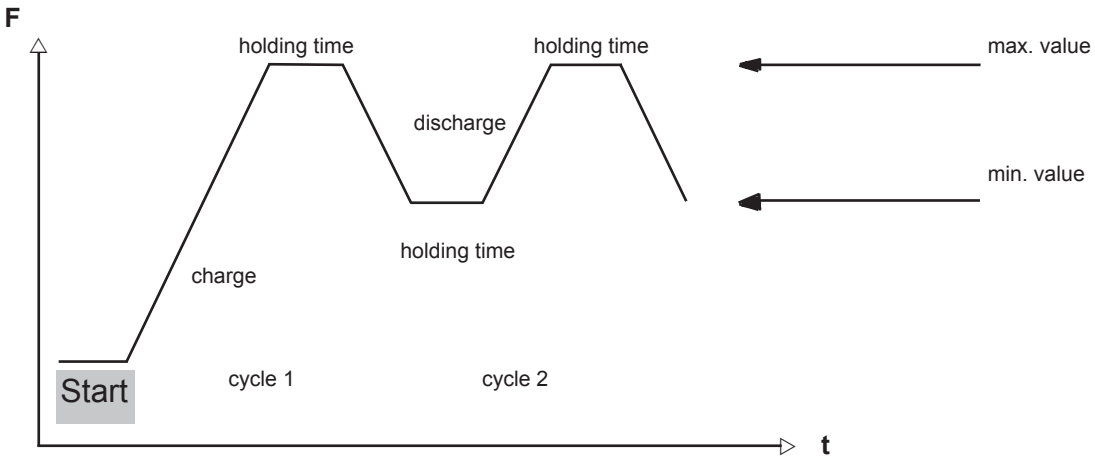
The machine is only charged to the minimal value when the number of cycles is higher or equal to 1.

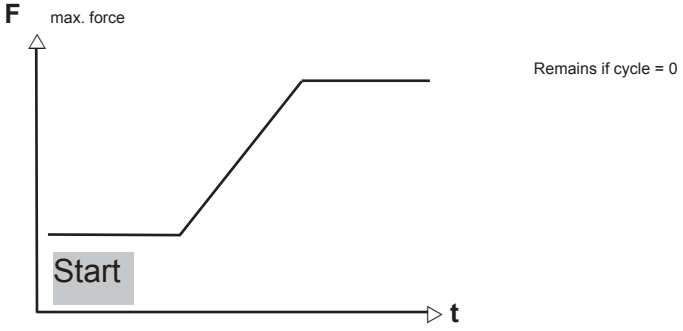
If you select displacement, deformation or external as a control parameter, the load is replaced by the respective parameter (option).

- **Ramp Programming for Cyclic Tests**

Entrance from main menu (ramp). Here cyclic test can be programmed, but only for testing in kN (not in N/mm²)

- number of cycles determines how often the specimen is charged/discharged. With 0 the machine is run up to the set maximal force. The force stops at this point. With STOP you can discharge again.
- holding time determines how long the machine stays on the max. and min. loading points.
- vel. determines how fast the specimen is charged resp. discharged
- max. value determines the upper limit of the ramp
- min. value determines the lower limit of the ramp





- **Automatic Test Course**

Settings before the test in case of display in N/mm²

Break detection BD must be activated. The selection of the specimen must be already made, e.g.:

☐ 200,0 (cube with edge length 200 mm)

∅ 160 (cylinder with Ø 160 mm)

Course of the Test

key

Extension of piston:	The peak is automatically activated and is restored together with the break detection. The force is zeroized and the frictional connection is detected.
Charging:	The specimen is charged up to its break with a programmed speed.
Sinking:	The break detection has come into action: - the printer prints out (option) - the piston sinks - the sinking time runs down (can be prematurely stopped with STOP). - the piston stops -2 x STOP: the proton returns completely to its initial position.

Additional Test Courses

Change-over of parameters (option)

Setting operation (option) - e.g. the specimen is set displacement-controlled, the test is made force- or displacement-controlled

• **Test course with measuring and weighing**

1. Select the specimen type with CALC.
2. Start the test by pressing START, the measuring screen is invoked.
3. Input the dimensions or measure them.
4. By means of the key START return to the test screen and carry out the test.
5. Combined with a printer a print-out is effected automatically after rupture if the break detection is activated.
6. Without measuring/weighing of the specimen the measuring invocation can be omitted by key EX.

Key FNC

In case of selected specimen type you can - after the test -switch over from N/mm² to kN by pressing key FNC.

The correct display of the load pacer is important, as the specimen is charged according to this:

N/mm²		kN
N/mm²/s		kN/s

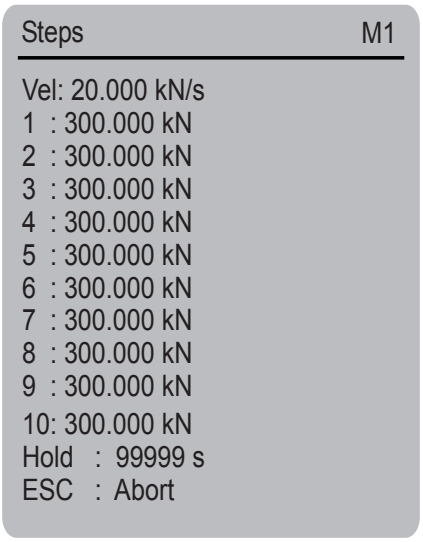
In case of specimens with selected conversion factor the breaking load is indicated furtheron with 100%.

Without Selection of Specimen

Measuring and weighing is inhibited.

- **Step programming**

With thies step program max. 10 programmable steps with common speed and holding time can be run up and down. if it should run further on the programmed steps only after the manual START, you have to set a holding time of "0 seconds" (no holding time). Ramp and holding time can be stopped with START at any time.



Force control and force display

Max. 10 steps

Velocity range of a 3000 kN machine:
0,001 ...3000 kN/s

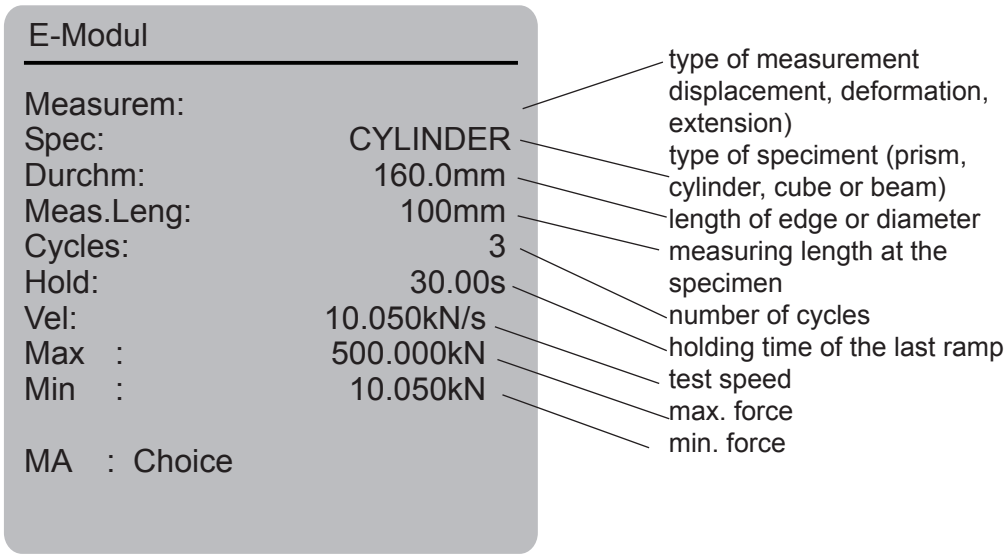
Holding time in seconds max. 99999 s
Setting: 0 s = automatic holding and extension with START

Setting is done by means of a numerical keyboard and the key

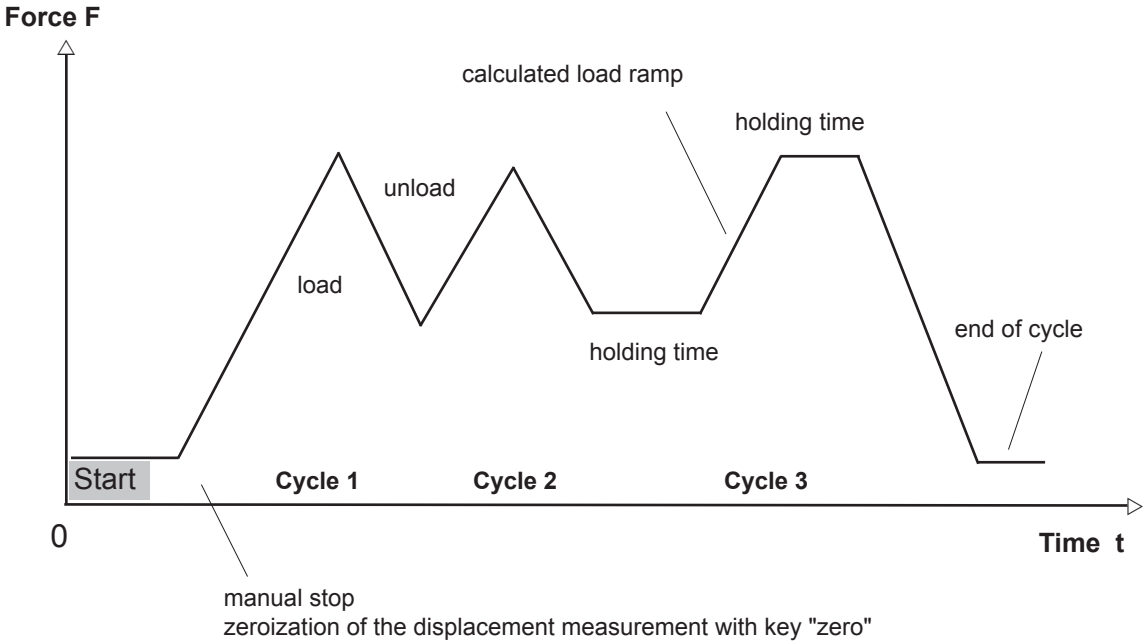
- **Programming of Elastic Modulus**

With this program the programming of test course for the determination of the elastic modulus conforming to standards DIN 1048 and EN 196 is possible.

In this test program the control system is always force-controlled.



Test Scheme:



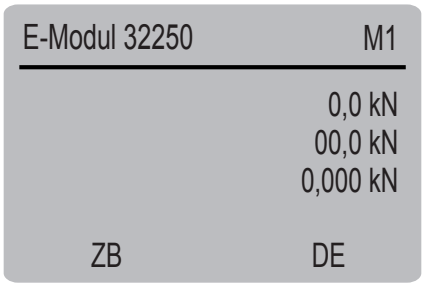
- **Calculation of Elastic Modulus**

After the execution of the ramp which is determining the elastic modulus the value of the elastic modulus is printed out by a connected printer

Example:

ELASTIC MODULUS	32250 N/mm
CUBE	150,0 mm
EXTENSION 1	0,001 mm
LOAD 1	0,5 N/mm
EXTENSION 2	0,101 mm
LOAD 2	22,0 N/mm
MEAS. LENGTH	150 mm
AGE	30 Tage
TESTER	5
ORDER	98123
IDENT	1
DATE	23:01:98

and, at the same time, is shown at the test screen:



Calculation Formula for the Elastic Modulus

$$\frac{\Delta F}{\Delta D} * \frac{Lo}{fp}$$

Δ**F** = force difference

Δ**D** = deformation difference

Lo = measuring length

fp = specimen's area of cross section

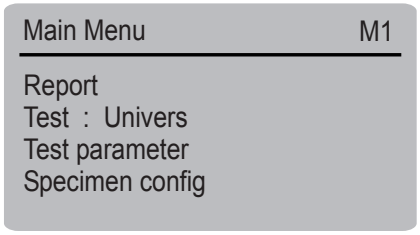
- **Universal Programming (Option)**

SoftwareModule U - Smooth Commutation of Control Parameters

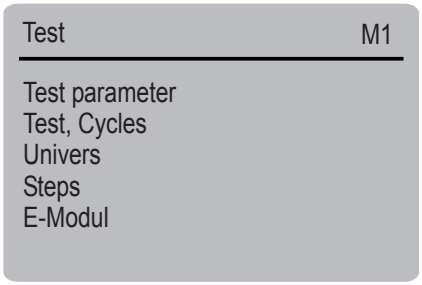
Functional Description

The smooth commutation between the control parameters „force“, „displacement“, „extension“ and „extern“ makes possible the execution of demanding tests of building material or metallic material. The test procedure is programmed in three ramps which are freely definable in control parameter, load speed, ramp value and holding time. During the test the commutation is effected automatically or prematurely by pressing the key. The smooth commutation is also possible in PC-operation.

Operation

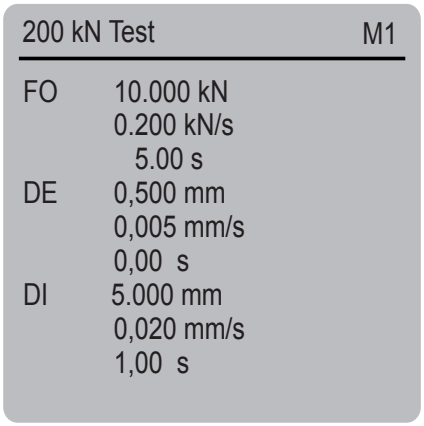


Indication of the test type



Programming of the test

Selection of the test type under menu "settings"



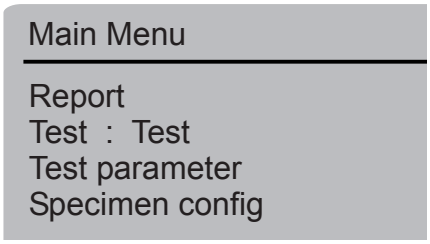
Programming example for a universal test with three ramps, force-,extension-,and displacement control

- **Adjustment (Option)**

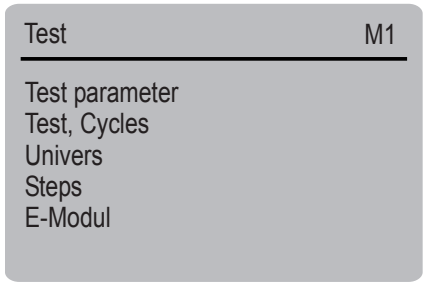
After having pressed the key START the hydraulic cylinder can be run or stopped in any position by means of the arrow keys or the connected handwheel.

This is necessary if you want to clamp e.g. a specimen for tensile test.

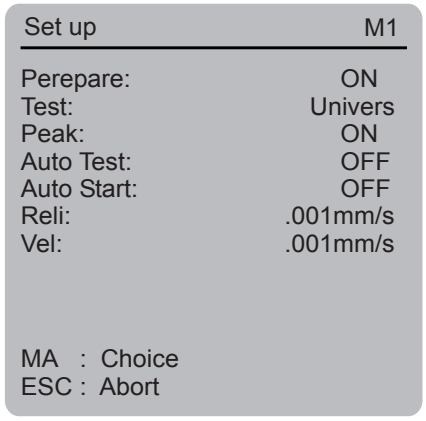
Operation:



Call up menu "test"



Activation of the adjustment mode in menu "settings"



Adjustment: ON/OFF

Test: inthe adjustment mode only universal test is possible

Peak: peak value memory ON/OFF

Auto course: ON/OFF

Auto Start: ON/OFF

Discharge: Discharging speed of the piston

Start: Starting speed of the piston

- **Sub-menu Settings**

Set up	M1
Sink time:	ON
Time:	3.0s
Auto Zero:	ON
Disp.measur:	ACT
Pacemaker:	FO
Zeroband:	ON
Break detec:	OFF
Level:	20.0%

MA : Choice
ESC : Abort

step on

- **Sinking Time**

The **sinking time** permits a controlled return of the machine's piston after the break, i.e. after this time the piston is stopped. The sinking time is activated by the specimen's break or by the stop key. With stop the sinking time can be aborted. After this time it can be activated by stop once again, that's why the piston is sinked completely.

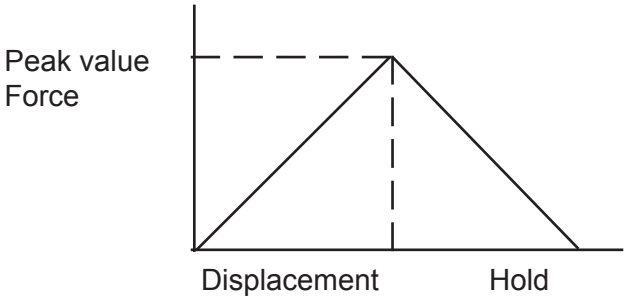
- **Automatic Zeroizing**

1-2 seconds after starting the display is automatically set to zero.His important that there is not yet a frictional connection, as otherwise the breaking load won't be correct.
For this zeroizing the machine needs approx. 2 seconds. So please take care that the sinking time is respectively set, so that with the next test after the start signal there are at least 2 seconds left for the piston's extension to the specimen.

Displacement Measuring: (Option)

AKT: travelling displacement display, which always measures and indicates the actual displacement.

HLD: displacement display is stopped at force maximum, i. e. it is only measured in case of increasing force. PEAK-measurement must be on.



MAX: displacement display is stopped at maximum value, i.e. the maximal displacement is measured and indicated. PEAK-measurement must be on.

- **Load pacer**

In case of double display the **load pacer** can be firmly adjusted to force: FO or selection ANW.
In case of selection: ANW the parameters FO,DI,DE and EX can be freely selected.

- **Zero Band**

If the **zeroband** is activated changes around the zero point which are smaller than 0,1% referred to the final value (option) are suppressed. For calibration the zeroband can be switched off.

- **Break Detection**

The **break detection** must be switched off in case of tests which are displacemenresp. deformation-controlled or tests during which the ramp is run downwards and in case of calibration. The treshold in %0 of the machine range corresponds to the force drop, which is necessary to release the break detection.

After starting the display switches from BD to BR. If a printer is connected a test printout (certificate) is printed automatically. The break detection is reset with RES.

* Function: Break detection due to force decrease. When a specimen breaks the force decreases. If the level is exceeded, the break is detected.

This level can be set between 1 and 100 %0. The default value is 50 %0. If e.g. hard specimens should not be destructed too strongly, the level must be set lower. For further information please see “sub-menu settings”.

- **Limiting Values (Option):**

* FIX Max. limit at 103% or at the end of the converter range. MAX display. RES key for deleting.

* 2SP 2 limiting values MIN and MAX, programmable or at the beginning or the end of the converter range. MIN./MAX. display. RES key for deleting. Can be switched on and off separately.

* 2NS 2 limiting values MIN and MAX, programmable or at the beginning or the end of the converter range. MIN./MAX. display. Deleted when sinking below the programmed hysteresis point by 2%. Can be switched on and off separately.

As a safety, the limiting values also react at - 4,6% (MIN) and + 104,6% (MAX) of the uncalibrated measuring range. This corresponds to absolute zero resp. the end of the A/D converter range. This case occurs if

tare point + MIN.-limiting value

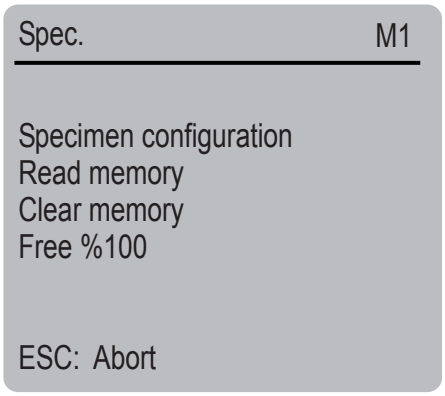
or

calibration point + MAX.-limiting value

exceed the converter range.

The maximum and minimum limiting values can be set for the protection of the machine or of the specimen. In the customer's configuration the maximum and minimum limiting value can be separately switched on and off and the levels can be programmed as well. Programmable limiting values (2SP, 2NS) can be set in digits in the range of -3% up to 103%. Switch on with MA.

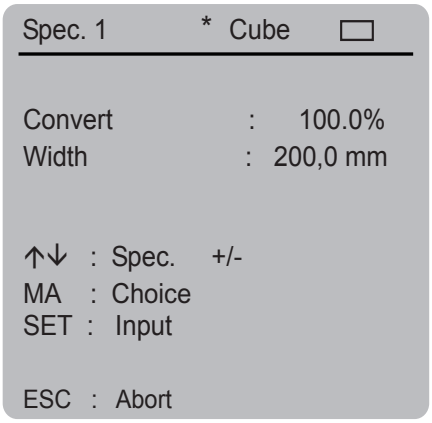
- **Specimens' configuration / Specimens' memory**



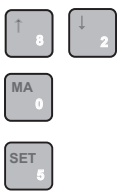
- Speciment configuration:

Open this menu window by pressing key ENTER and subsequent input of an access code.

Code: The code is given along with the operating manual.



Up to 30 specimens are freely configurable. Specimens 1 to 3 are configured by the factory.



Select the specimens to be configured (max. 30)

Select the type of specimen (cube, prism, cylinder,rod, plate)

After pressing SET the numeric keys are active. Press the ENTER key when the measure input is completed.

Conversion input: conversion factor in order to display and print out e.g. the strength with 95%.

As soon as another value than 100% is set for the conversion it is displayed by a "*" in front of the specimen type.

Measure input:
cube: max. 999 mm side length (edge)
prism: max. 99999 mm² face
cylinder: max. 999 mm diameter
plate: max. 999 mm length, max. 999 mm width

The following inputs are possible:

cube	stone
prism 3-point	beam 3-point
pressure prism	beam pressure
prism 4-point	beam 4-point
plate	off
cylinder	
rod	
rod	

- Read Storage:

By pressing the key ENTER the output of the stored data to a PC which is connected by the COM-interface is effected.

For each specimen the settings for the print-out, the type of specimen, the measuring results and the calculated strength are stored and output.

The data are only stored by the manual pressing of the key DATA at the end of the test or automatically after the the detection of the specimen's break (when "break detection" is activated – option)

The data of the specimen can be transferred to the PC by a serial COM-interface and can be stored at the same time.

- Delete Storage:

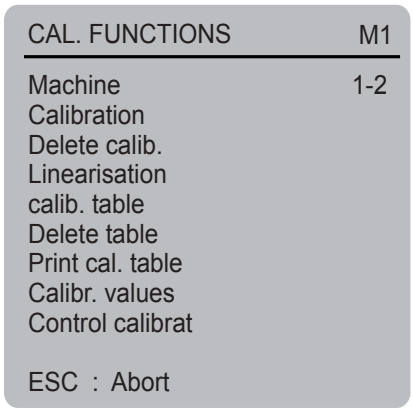
All stored specimen data are deleted by pressing the key ENTER. The storage is reset to the initial value. After having read the data the storage should be deleted so that the system is ready for the next tests.

- Free % 100:
Indication of the free storage in %.

100% - the storage is empty
0% - the storage is full, no more data can be stored.

- **Sub - menu "Calibration"**

Select sub-menu: factory calibration
Set cursor to calibration
Press ENTER
Set the calibration code XXXX



Select the machine.
Set cursor to the required line.
Press ENTER to reach the desired machine.

- **Calibration Layout**

Delete the table (in case of first calibration only).

ZERO Reset the display to zero (first calibration: zero reset with trimmer Z)

The calibration is executed at 80% of the measuring range.

1.
START Run selected calibration value manually according to the calibration instrument asdescribed under point "Manual operation". The display can deviate from the screen.
2.
↵ The machine discharges. The calibration value is newly calculated. First calibration: Run calibration value according to display. Set calibration value with trimmer G at the calibration instrument.

- **Delete cal**

The saved calibration is deleted.

- **Linearisation**

The precision of the testing machine can be increased by means of linearisation. If the table is empty, all points have to be run. This is not necessary if you want to correct individual points´.

Procedure:

START The piston is extended.

↵ (force free)
0% calibration value is read in. The display is set to zero,calibration value to 2%.
Now, as described under point "Manual operation" run to 2% of the max. force.

↵ 2% calibration value is read in and is increased to 4%. Run machine up to 4% according to the calibration instrument.

↵ 4% calibration is read in and increased to 6%. Apply same procedure for 10, 20, 40, 60, 80, 100% as in step 2 for 4%.

At the first recording of the linearization values, all points have to be run. If a wrong measuring value is read in, press DI or DE to switch to the old position. Press ENTER again when the correct calibration value appears. After the last input (100%) the message “table completed” appears.

DI 9 select the next higher calibration value.

DE 1 select the next lower calibration value.

ESC DEL DATA Abortion with storage of the linearisation value

ESC DEL ESC DEL Abortion without storage

⚠ **Attention:** if the linearisation is executed it is not allowed to calibrate anymore!

- **Calibration Table**

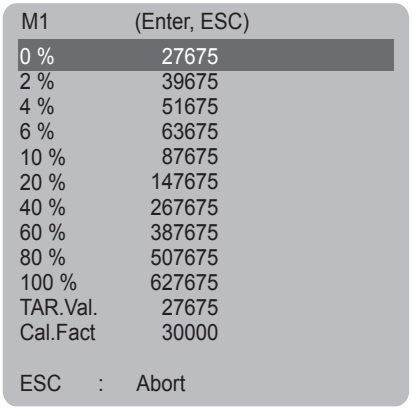
The calibration table contains the values measured during calibration/linearization. Individual values can be corrected by input.

⚠ Attention: If there is no print-out it is advisable to note down the table for the present.

Select the correction line with the ENTER key. Overwrite the line directly with the new value.

⚠ Attention: The keyboard is directly in the number mode. If there is an input in the wrong place then the relevant calibration value is lost. But if the calibration table is left by ESC the modifications are not valid. To get back to the old values, the instrument has to be switched off and on again.

Calibration Table Before Calibration/Linearization



- **Delete the Table**

By pressing ENTER the values, which have been read in during the calibration / linearization, are deleted and the table is reset in its starting position.

⚠ Attention: if no print-out has been made, it is adrisable to note down the table!

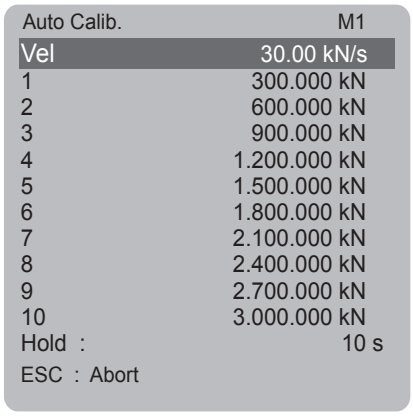
- **Print-out the Table**

By pressing ENTER the calibration table is printed if a printes is available.

- **Calibration Values**

To check the calibration of a machine a calibration series has to be run.

Calibration values: Input of max. 10 loading steps and one speed holding time. The inputs can be stored.



The calibration series can be automatically run at first upwards and then downwards. After expiry of the holding time or by renewed pressing of START the next value is run.

After pressing the START key the first calibration step is run. (The zero adjustment is effected automatically.)

- **Manual Operation**

Application

Manual charging with partial or full load, for example for calibration or linearization.

Procedure

Start the test.

By pressing START once more the control unit switches from CHARGE to MANUAL STOP and stops the ramp.

MANUAL UP 1..4
Slow run up with step 1. By pressing the key again you can raise the step.

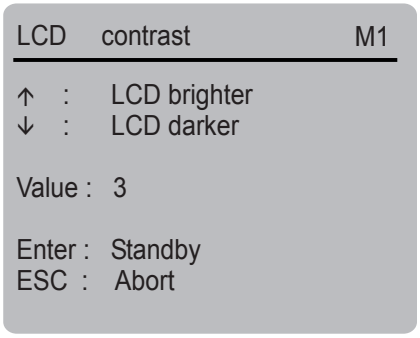
MANUAL DOWN 1...4
Reduction of step UP to step DOWN by repeatedly pressing this key.
Slow run down to step 1. By repeatedly pressing the key you can raise the step DOWN. Reduction of step DOWN by ↑.

MANUAL STOP
With this key you can stop at any time.

Setting of the steps:

Step 1: 0,01 % Step 2: 0,25 % Step 3: 1,0 % Step 4: 5 % of the max. force

- **Sub - menu LCD Contrast Setting**



Selection through main menu

By means of ↑ and ↓ the contrast of the LCD-display can be adjusted in 8 steps for the compensation of strong temperature fluctuations.

↑ 8 lighter

↓ 2 darker

By pressing ENTER the display is switched to the standby - function. By pressing any key it is switched back to the operation mode.

- **Sub-menu „Measuring / Weighing“ (Option)**

Starting from the main menu by means of the key ENTER at „measuring / weighing“.

Set up	M1
Vernier Inp.	ON
Balance Inp.	MET
Height measur	ON
Cube :	150,0 mm
Plate:	35,0 mm
MA : Choice	
ESC : Abort	

The three inputs for measuring, weighing and height measuring of the specimen can be switched on and off separately, if these connections are installed and released in the works configuration.

MA 0 commutation ON/OFF

In the beginning of the test the specimen’s dimensions are selected by means of key CALC. With key START you can switch over to the measuring screen.

Dimensions	
Lenght :	150,0 mm
Width:	150,0 mm
Height:	150,0 mm
Weight:	7520 g
Bulk density:	2228kg/m^3
Start : Furtheron	
ESC : Abort	

Length: Input by means of a connected sliding caliper or by means of the keyboards and key ENTER.

Width: Input by means of a connected sliding caliper or by means of the keyboards and key ENTER.

Height: Input by means of a connected sliding caliper or by means of the keyboards and key ENTER.

In case of configuration of a height measuring i.e. displacement measuring system at the test cylinder, this fade-in does not appear.

Weight: Input by means of a connected balance or by means of the keyboards and key ENTER.

START Starting of the test cylinder

- **A-4-Page printer**

With the operation of an A4-page printer the title „TEST RECORD“ is printed and the line counter is reset after pressing the key ENTER.

Release of the print-out with key DATA or after release of the break detection.

The printer is to be connected to the serial interface RS 232 at the DigiMaxx.

- **Handwheel (Option)**

The operation of a machine with a handwheel enables you to position the hydraulic cylinder of a machine very accurately.

After pressing START the control system goes to Manual-Stop and now - by turning the handwheel to the left or to the right - the hydraulic cylinder can be run up- or downwards. By switching over the flip switch the piston’s speed can be increased or decreased.

Installation of the software *Proteus*

FORM+TEST PRÜFSYSTEME

IP

Proteus is a 32 bit application and can therefore be installed on the following operating systems:

- Microsoft Windows NT 4.0 with Service-Pack 3 or higher
- Microsoft Windows 2000
- Microsoft Windows XP

Attention: Windows 95/98/ME are not allowed anymore, also not for the updates. Microsoft Windows Vista is not released at the moment.

Important when the installation is under Windows NT, 2000 or XP:
In order to install the software the user must have administrator rights.

Procedure:

- Place the CD-ROM into your CD-ROM drive.
- In the event the installation doesn't start automatically, click on the Start button on your windows task bar then on Run. Type in the **drive letter** of the CD-ROM drive followed by **":setup.exe" and click on OK.**
- With **the choice of the language** you decide in which language the **screen prompts are given during the installation of the software.** The actual language the program operates in can be changed at any time with in **Proteus.**
- Follow the remainder of the on screen instructions
- Once the programme is installed it can be started by double clicking the **Proteus** icon on your desktop.

Additional notes:

After a new installation:

- After installation you must load the **experiment modules** from the CD-ROM this is done by clicking on the Menu *Configuration*, and clicking *Experiment module*.
- Now you are able by clicking on the Menu *Configuration* and picking *tuner amplifiers,* g*auges* to **configure the whole system** including servo(s), machine(s), channels and gauge(s) such as Vernier calipers, scales, measuring station etc...

After installing an update:

- A new version can always be installed over an existing one. However, it is recommended to first make a **backup copy** of the **Data** and **Gendata folders,** or to copy the complete Proteus folder into a temporary folder.
- All configurations and settings, particularly formulas, test scripts etc... remain unchanged.
- **Warning:** Problems can occur due to the rounding of the values of certain parameters such as weight, density, BW factor etc in existing test templates. In the event of a problem please check the values on the problematic test template.

Please also consult the chapter regarding computer system requirements (in the Proteus Manuel).

Configuration of a testing machine on site, with a customer supplied personal computer (i.e. no PC is delivered)

- The configuration is stored in the folder **"Gendata"** and all the tests are stored in the folder **"Data"** on the enclosed Manual-CD (not Proteus-CD).
- After the installation of Proteus both folders **"Data**" and "**Gendata"** (with the path Program Files/Proteus) have to be overwritten by the folders saved on the supplied CD.
- Now the software is correctly configured and the tests, which were made in the factory, can be shown and – if necessary - repeated for demonstration or teaching purpose.

You will find the completely manual of the software on the enclosed CD.

OPERATING MANUAL

Electronic Double and Triple Strain Transducers LD DD1-2-3

Version 2

17.09.2002 as/la

Electronic Double and Triple Strain Transducers Type LD-DD1-2-3

for measuring the mean longitudinal deformation at two/three generating lines at concrete cylinders, prisms, cubes or drilling cores. It is very suitable for the determination of the modulus of elasticity (E-modulus) according to DIN 1048, EN 196, etc.

Consisting of:

- Electronic double strain transducer type BD 25/50-DD1
- Electronic triple strain transducer type BD 25/50-DD1

Technical data:

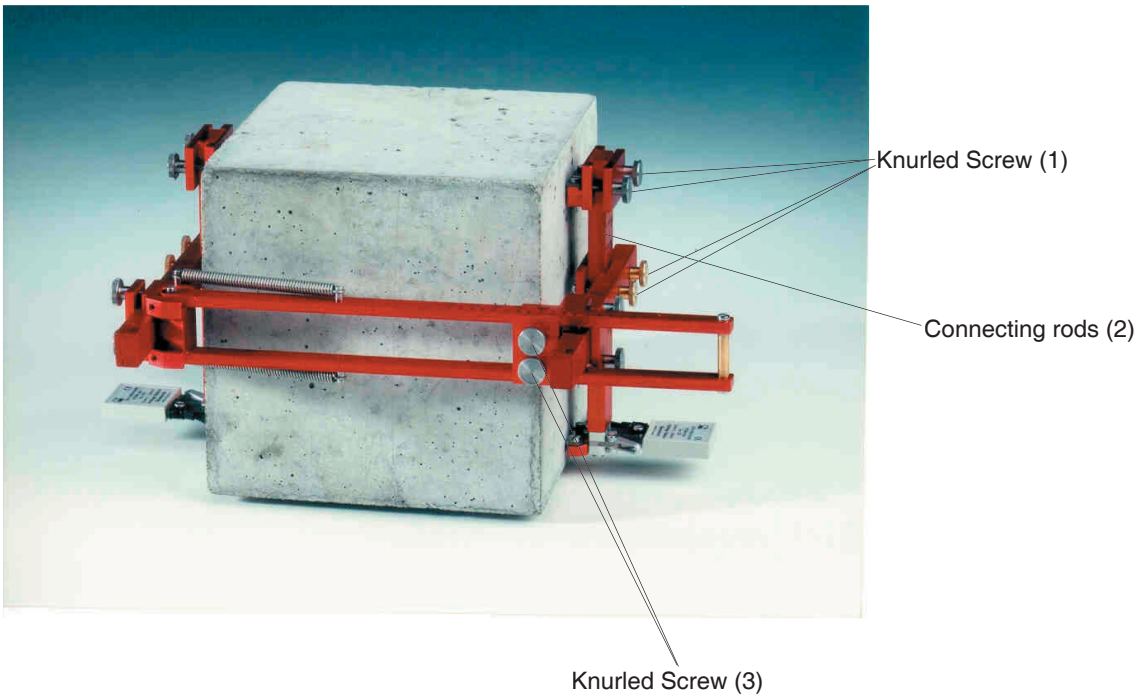
Transducer type:	HBM-DD1
Transducer bridge:	full bridge
Bridge resistance:	350 Ω
Measuring distance:	+/- 2mm (2mV/V)
Accuracy class:	0,1% of the nominal range
Supply voltage:	10 V DC
Allowed ambient temperature:	-10 … +60°C

- 4 sets of connecting rods for the following measuring lengths: 40-80, 60-120, 100-170, 150-220 mm, optional: 200-320 mm

- Clamping for prisms and cylinders: Ø 30…80 mm, 70…160 mm Optional: 150 … 250 mm

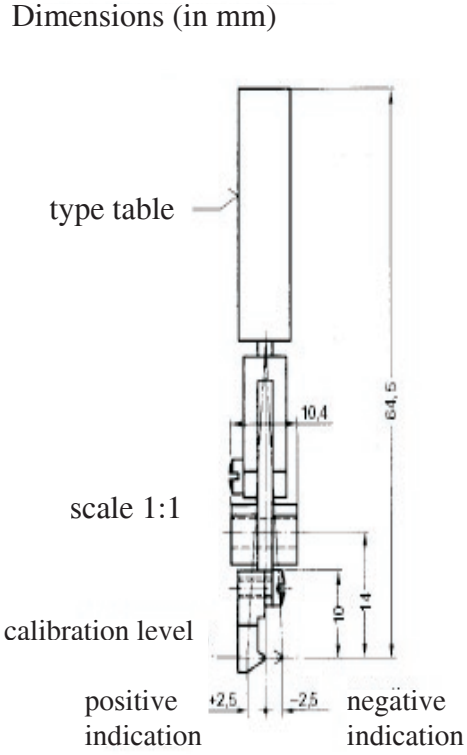
- Weight: 450 g
- Including: Aluminium box

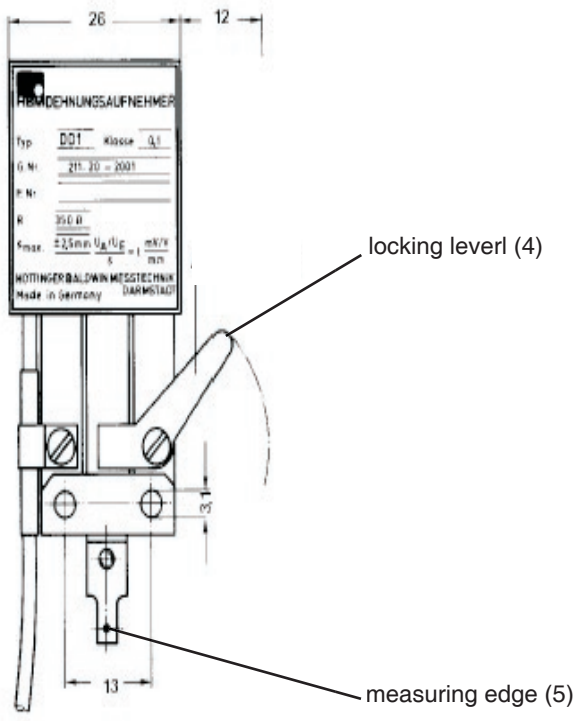
Measuring cable, 3 m with connection cable for mean value circuit



Double/Triple strain Transducer at concrete cube

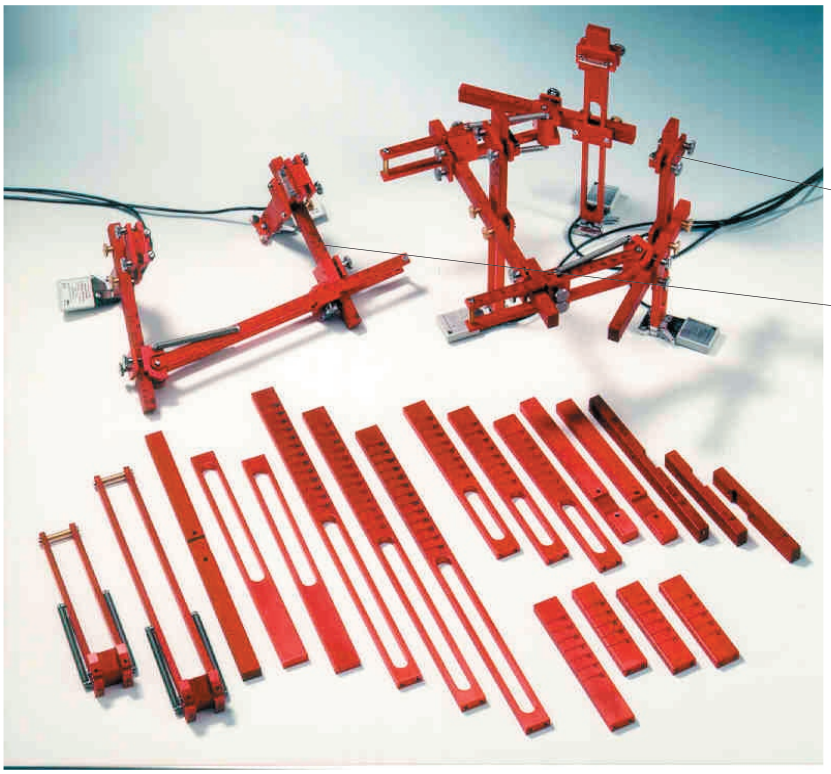
Dimensions (in mm)





pict. 2: measuring electronics

pict. 3: Triple Stain Transducer at concrete cylinder



pict. 4: Double and Triple Strain Transducer with accssories

Functional Description:

Double Strain Transducer LD-DD1-2
Triple Strain Transducer LD-DD1-3

1. Prepare the strain transducer by attaching the connecting rods corresponding to the specimen to be tested.
2. The dimensions of the specimen (length of face resp. diameter) can be adjusted by means of the scale at the connecting rods. Do the same with the measuring length LO.
3. Now the strain transducer is clamped at the specimen. The design of the strain transducer makes it possible to clamp it at a specimen which is already placed in the testing machine and to remove it again.
4. When the strain transducer is exactly adjusted, the locking levers are slewed out so that the measuring edges get free.
5. Zeroize the electronic system and charge the specimen corresponding to the respective standard.
6. To avoid any damages, the specimen must not be charged until it breaks if the strain transducer is clamped at.

Standard Test for the Determination of the E-Modulus according to DIN 1048 and EN 196

According to DIN 1046 ten load cycles have to precede the measuring cycle which determines the E-modulus.

According to EN 196 1..3 load cycles have to precede the measuring cycle which determines the E-modulus.

- The lower test voltage is specified as 0,5 N/mm²
- The upper test voltage is specified being approx. 30% of the expected breaking load.
- The loading speed should be 0,5 N/mm²/s.

The following values are necessary for the determination of the compression-E-modulus:

= force difference in N=..
= area under pressure in mm²
= strain difference in mm = L…
= measuring length mm

These data must be inserted in the following formula:

ED = …

Example for the Calculation of the Compression-E-Modulus

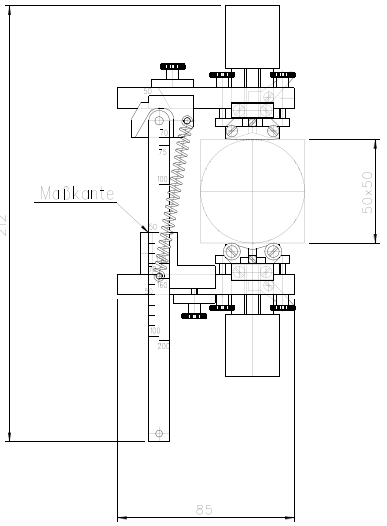
Given:	specimen (lxwxh)	40x40x160 mm
	area under pressure (A)	1600 mm²
	measuring length (L0)	100 mm
	Force min. (F1)	0,5 □ 800 N
	Force max. (F2) = 30% of the expected breaking load	25,5 □ 40800 N
	This results in:	Δ F □ 40000 kN
	Extension (L) on F	0,002 mm
	Extension (L) on F	0,145 mm
	This results in:	Δ L □ 0,143 mm

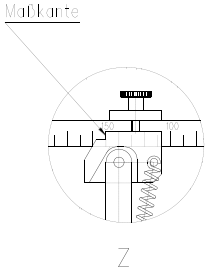
This example results in the following E-modulus:

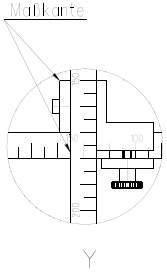
$$ED = \frac{\Delta F \times L_0}{\Delta L \times A} \quad \frac{40000\ N \times 100\ mm}{0{,}143\ mm \times 1600\ mm^2} = 17482{,}5\ N/mm^2$$

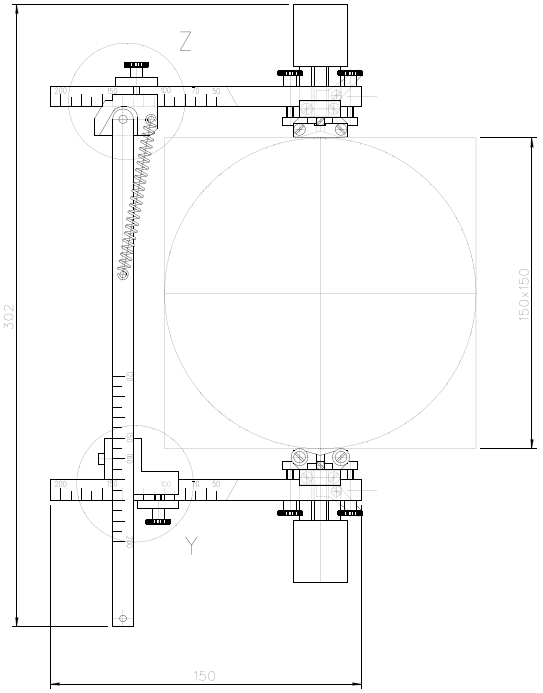
or ED = 17482,5 MPa

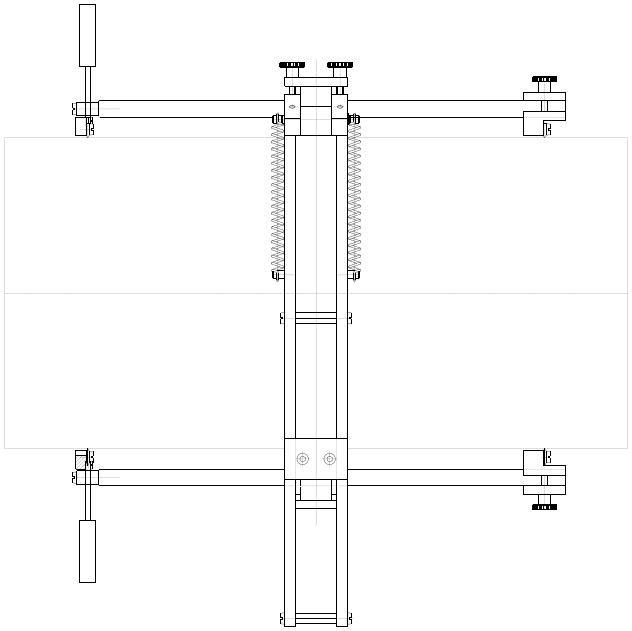
DD1-2



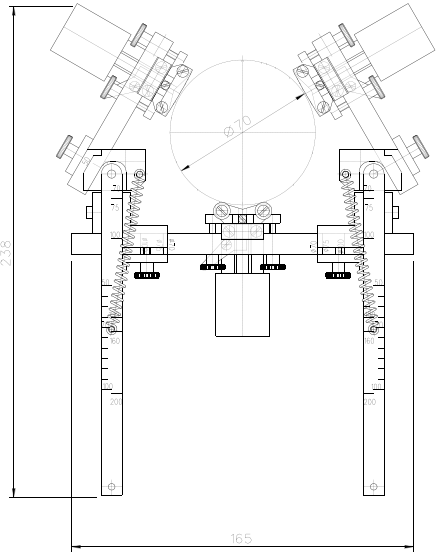


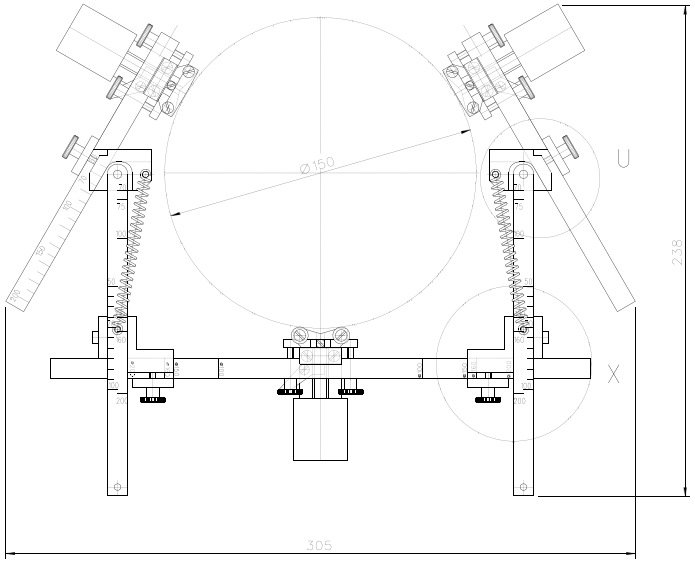


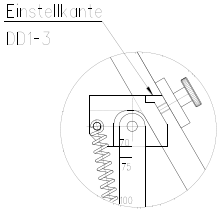


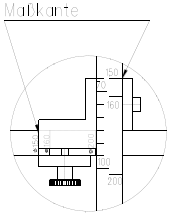


DD1-3









Meßlängen: 40 - 80
60 -120
100 -170
150 -220
200 - 320

DD1-2 - Würfel+Zylinder 30x30 - 200x200/ø30-ø200
DD1-3 - Zylinder ø70-ø200

Allgemeintoleranz nach DIN ISO 1302	Maßtoleranz gemäß nach DIN ISO 2768 m	Maßstab 1:1,25			
	Datum	Name	Dehnungsaufnehmer		
Bearb.	27.09.	Steiner	Type DD / DD1-2 (3)		
Gepr.	28.09.94				
Norm					
Werkstoff			M 19 0000 19 1		Blatt 01

A1.1 Basic Data

FORM+TEST PRÜFSYSTEME

B1

Distributor	
Customer	**Servi Motion**
Order no.	**07/1285**
Year of construction	**2007**

Machine M1	**ALPHA 3-3000**
Machine M2	**DELTA 5-200**
Machine M3	
Machine M4	
Drive	**AS-C20-N**

Colour	**RAL 7032**
	RAL 3002

Note:

Unassigned data fields are irrelevant for your machine configuration. The respective options are not included in the scope of supply or rather in the present equipment .

Inspected by	**Daniel Nacke**
Date	**10.04.2007**

Qualität
mit Brief und Siegel.
Wir sind zertifiziert.
ISO 9001
TÜV CERT DIN EN ISO 9001

A1.2 Machine Record Card

FORM+TEST PRÜFSYSTEME

B2

Machine M1

Type of machine	ALPHA 3-3000				
Machine no.	02643				
Max. test force	3.000	kN			
Strain test	☑				
Accuracy class	class 1				
Cylinder no.	07034				
	Width	Depth	Height		
Dimensions framework	750	650	1.750	mm	
Dimensions hydraulics	650	1.100	2.100	mm	
Dimensions of bore holes machine base	680	380		mm	
Dimensions of bore holes drive	380	650		mm	
Weight framework	1.800	kg	Weight hydraulics	280	kg
Remarks					

Machine M2

Type of machine	DELTA 5-200				
Machine no.	41000				
Max. test force	200	kN			
Strain test	☐				
Accuracy class	class 1				
Cylinder no.	06121				
	Width	Depth	Height		
Dimensions framework	1.450	850	2.350	mm	
Dimensions hydraulics				mm	
Dimensions of bore holes machine base	1.270	500		mm	
Dimensions of bore holes drive				mm	
Weight framework	1.700	kg	Weight hydraulics		kg
Remarks					

A2 Hydraulics and Electrical System

FORM+TEST PRÜFSYSTEME

HE

Supply voltage	**3 x 400 V + N + PE 50 Hz**
Control	**automatic**
Control cabinet	**600/800/2000**
Electronic system	**DigiMaxx C20**
Measuring amplifier below	**2M 2A**
Measuring amplifier above	

Hydraulic pump	**RZ 1,4/2-9/B30-Z 1,5**
Pump motor	**90 L 4-1,5 kW**
Oil cooler	**CP-STD-224**
Oil filter	**HP31.10VG.HR.E.P.G.3.-.AOR**
Filter cartridge	**300065**
Main stop valve	
Flow control valve	
Hydraulic hose	**2X S16 500 long** **1X S20 400 long**
Hydraulic connections at the control cabinet	**1X S20 , 1X S12 , 2XS16**
Servo valve	**HVM 025-003-1200-4G**
Solenoid valve	**2X G 3-2 , 1X G 3-3**
Back pressure valve	**ÜK-18-20**
Oil type	**HLP 68** — Oil quantity **33** litres
Sound pressure level	**68** dB (A)

Motor protection switch	
Motor protection switch relay pre-set	**3,60** Ampère

Software 1	**Proteus**	Version	**7.4.0**
Software 2		Version	
Software 3		Version	
PC			
Monitor			

Electrical plan no.	**300 E 3031-1**
Hydraulic plan no.	**300 H 1040**

Remarks	

07/1285

A2.1 Hydraulics and Electrical System

Data of sensors/valves M1

FORM+TEST PRÜFSYSTEME

M1

	Force		Piston stroke		Deformation	
1. Measuring range	**3.000**	kN		mm		mm
2. Measuring range		kN		mm		mm
3. Measuring range		kN		mm		mm
4. Measuring range		kN		mm		mm

Manometer		kN		kN		kN
Manometer-Ø		mm		mm		mm
Manometer no.						
Pressure transducer	**P8AP-500**					
Pressure transducer no.	**103410258**					
Force transducer						
Force transducer no.						
Displacement transducer	**TS 100**					
Displacement transducer no.	**023235**					
Extension sensor	**LD-DD1-3**					
Extension sensor no.	**105030032/105030031/105030018**					
Piston stroke position switch	**LS-11/XLA**					
Door position switch	**LS-11/P**					
Reversing valve						
Stop valve						
Manometer throttle valve						
Safety valve	**MV 42 BR**					
Safety valve pre-set	**410,00**	bar				

Remarks	

A2.2 Hydraulics and Electrical System

Data of sensors/valves M2

FORM+TEST PRÜFSYSTEME

M2

	Force		Piston stroke		Deformation	
1. Measuring range	**200**	kN		mm		mm
2. Measuring range		kN		mm		mm
3. Measuring range		kN		mm		mm
4. Measuring range		kN		mm		mm

Manometer		kN		kN		kN
Manometer-Ø		mm		mm		mm
Manometer no.						
Pressure transducer						
Pressure transducer no.						
Force transducer	**CTC4-200 KN**					
Force transducer no.	**402795**					
Displacement transducer	**TLH 225**					
Displacement transducer no.	**025309**					
Extension sensor	**2X displacement tracer WA/50 mm**					
Extension sensor no.	**displacement tracer No. 110710151/110710157**					
Piston stroke position switch						
Door position switch	**(2X) LS-11/XLA**					
Reversing valve						
Stop valve						
Manometer throttle valve						
Safety valve	**MV 42 CR**					
Safety valve pre-set	**220,00**	bar				

Remarks	

A3.1 Framework

FORM+TEST PRÜFSYSTEME

MR1

	M1	M2	M3	M4	
Pressure	3000	200			kN
Piston area	754,38	103,81			cm²
Piston ring area					cm²
Compression	397,48	192,55			bar
Piston stroke	100,00	220,00			mm
Dimensions of test chamber	340,00	220,00			mm

	M1	M2	M3	M4	
Pressure plates above	320X520X75	230X40			mm
Hardness	57,50	58,80			HRC
Depth of roughness	0,55	0,81			µm
Pressure plates below	320X520X75	230X40			mm
Hardness	57,30	58,10			HRC
Depth of roughness	0,59	0,60			µm

	M1	M2	M3	M4	
Distance plates Ø x thickness		Adapter Ø180X180			mm
Distance plates Ø x thickness					mm
Distance plates Ø x thickness					mm
Distance plates Ø x thickness					mm
Distance plates Ø x thickness					mm

	M1	M2	M3	M4	
Distance pieces	210X210X110				mm
Hardness	56,30				HRC
Depth of roughness	0,75				µm
Distance pieces	170x170x50				mm
Hardness	55,40				HRC
Depth of roughness	0,82				µm
Distance pieces	120x120x50				mm
Hardness	53,80				HRC
Depth of roughness	0,73				µm
Distance pieces					mm
Hardness					HRC
Depth of roughness					µm

Remarks	

A3.2 Framework

FORM+TEST PRÜFSYSTEME

MR2

	M1	M2	M3	M4
Grooved ring				
Wiper ring				
O-Ring	**310x6**	**24X3**		
O-Ring		**(2X)105X5**		
O-Ring				
O-Ring				
O-Ring				
Stepseal		**S90X105,1X6,3 T46N RSSO**		
Piston sealing		**O-Ring 105X5**		
Piston guide		**Teflon 9,5X2,5**		
Rod guide		**Teflon 9,5X2,5**		
Bellows		**FB 04 001 4**		

	M1	M2	M3	M4	
Diameter of bending rolls		**40,00**	**20,00**		mm
Length of bending rolls		**610,00**	**210,00**		mm
Distance of bending rolls		**1.020,00**	**300,00**		mm

Accessories

- see work card
- M3 = 4 point load

A4 Calibration table

FORM+TEST PRÜFSYSTEME

KT

Indicator no.	**07020**

Machine	M1		M2	
Measuring range	1		1	
0 %	**base table**		**base table**	
2 %				
4 %				
6 %				
10 %				
20 %				
40 %				
60 %				
80 %				
100 %				
Tare value				
Calibration factor				
Value 0 mV/V	**- 17,3**	kN	**- 1,4**	kN
Value 1 mV/V	**+ 1873,3**	kN	**+ 97,83**	kN

Machine				
Measuring range				
0 %				
2 %				
4 %				
6 %				
10 %				
20 %				
40 %				
60 %				
80 %				
100 %				
Tare value				
Calibration factor				
Value 0 mV/V		kN		kN
Value 1 mV/V		kN		kN

Remarks	

A5.1 Factory configuration electronics

FORM+TEST PRÜFSYSTEME

WE1

Electronic system	DigiMaxx C20
EPROM version	DMAX V9.60 SUCY

Machine configuration

	M1	M2	M3	M4
	ON	ON	OFF	OFF
FO	CH1	CH2		
FO	3000	200		
FO	kN	kN		
DI	CH5	CH5		
DI	100	220		
DI	mm	mm		
DE	CH6	CH6		
DE	2	2		
DE	mm	mm		
EX	OFF	CH7		
EX		50		
EX		mm		

Machine set

	M1	M2	M3	M4	
PI-susp.	2,0	1,0			s
Break test	0	0			‰
Load	0,5	0,5			%
Start	8,0	7,0			V
Step	0	0			
Number	0	0			
Relieve	-10,0	-10,0			V
B-susp.	2	2			s
P-Reset	ON	ON			
Stop	OFF	OFF			
Threshold	Gain:5,0	Gain:3,0			

Remarks

07/1285

A5.2 Factory configuration electronics

FORM+TEST PRÜFSYSTEME

WE2

Gain set

■ C20	□ C22	M1	M2	M3	M4
FO	FO	**15,0**	**4,0**		
0 %	0 %	**8,0**	**8,0**		
2 %	2 %	**6,0**	**6,0**		
4 %	4 %	**5,0**	**5,0**		
6 %	10 %	**4,0**	**4,0**		
10 %	30 %	**3,0**	**3,0**		
30 %	60 %	**2,0**	**2,0**		
60 %	80 %	**1,0**	**1,0**		
80 %	95 %	**1,0**	**1,0**		
DI	DI	**150,0**	**50,0**		
DE	DE	**20,0**	**20,0**		
EX	EX	**1,0**	**50,0**		
F.DI	F.DI	**5**	**5**		
F.DE	F.DE	**2**	**2**		
F.EX	F.EX	**1**	**3**		

Relays

MIN	**OFF**	MAX	**R2**
BREAK	**OFF**	M2	**R3**
M3	**OFF**	M4	**OFF**
I-MIN	**DOOR: OFF**	I-MAX	**RESERV: OFF**

Options

Ext. change-over	□ **ON** ■ **OFF**	10V output	□ **ON** ■ **OFF**
Break detection	■ **ON** □ **OFF**	Printer	**RSR**
Limit values	**OFF**	Keyboard	**MNU**
Pacemaker	□ **ON** ■ **OFF**	Adjust	□ **ON** ■ **OFF**
Language	**ENG**	Strength	**N/MM²**
Plug COM2	□ **ON** ■ **OFF**	Servo	**CS6**
Limit value factor	**20**	Ext. Soll	□ **ON** ■ **OFF**
PC control	□ **ON** ■ **OFF**	Memory	**OFF**
MIN Peak	□ **ON** ■ **OFF**	DATA Output	□ **ON** ■ **OFF**

Remarks	**Print Way: OFF** **Stop+Print : OFF** **Pump On/OFF : OFF**

Test Certificate

Customer : Servi Motion

Order number/DKD-number: 07/1285

Machine:Typ/Force/No./Year: ALPHA 3-3000 , 200kN , M.Nr.02643 , 2007

No. of: Display/Trancducer: C20/07020 , TC4200kN/402795

Calibrationtemperature: 20,0 ℃ (Room) 20,5 ℃ (Cal ibration Loadcell)

Hardness of pressure plate : 57,5 HRC (Top) 57,3 HRC (down) Flatness plates (Top): O.K

Roughness of pressure plate : 0,55 µm (Top) 0,59 µm (down) Flatness plates (down): O.K

Measure devices	Manufactor	Typ	Serialnumber	Calibrationcertificate	valid
Compression Loadcell :	HBM	C18	00282L3N	BAM-S1 E1661	Sep.2007
Measureamplifier :	Hottinger	DK 38 S6 S32	20320005	17871 DKD-K-00101 06-09	Nov.2008

Location of machine: Factory

(complete Adress):

Date of test/ Tester : 19.03.07 Nacke

Notes :

Step [kN]	Set value [mV]	Value 1 [mV]	Value 2 [mV]	Value 3 [mV]	Average [mV]	Reversi-bility [mV]	Relative error of accuracy q[%]	Rel. reversibility *v* [%]	Relative repea-tability b[%]	Rel. std-deviat. [type A] A[%]	Rel. display resolut. a[%]
2	0,01333	0,01335	0,01335	0,01335	0,01335	0,01344	-0,12	0,67	0,00	0,00	0,50
5	0,03334	0,03335	0,03335	0,03337	0,03336	0,03355	-0,06	0,54	0,06	0,02	0,20
10	0,06667	0,06666	0,06665	0,06667	0,06666	0,06698	0,02	0,47	0,03	0,01	0,10
20	0,13335	0,13328	0,13328	0,13330	0,13329	0,13381	0,04	0,38	0,02	0,01	0,05
40	0,26670	0,26653	0,26651	0,26654	0,26653	0,26738	0,06	0,32	0,01	0,00	0,03
60	0,40005	0,39980	0,39963	0,39979	0,39974	0,40090	0,08	0,28	0,04	0,01	0,02
80	0,53341	0,53313	0,53311	0,53311	0,53312	0,53433	0,05	0,23	0,00	0,00	0,01
120	0,80011	0,79987	0,79984	0,79986	0,79986	0,80097	0,03	0,14	0,00	0,00	0,01
160	1,06679	1,06672	1,06668	1,06668	1,06669	1,06735	0,01	0,06	0,00	0,00	0,01
200	1,33343	1,33360	1,33353	1,33355	1,33356		-0,01		0,01	0,00	0,01

	Value 1	Value 2	Value 3
Residual display Fio [kN]	0,0000	0,0000	-0,0100
fo [%]	0	0	-0,01

This document is not valid any longer after transport or relocation of machine

Acceptable maximum value in %	Class 0,5	Class1	Class2	Class3
Relative error of accuracy "q" :	± 0,5	± 1,0	± 2,0	± 3,0
Relative error of reversibility "*v*" :	±0,75	±1,5	±3,0	±4,5
Relative error of repeatability "b" :	0,5	1,0	2,0	3,0
Relative zero error "fo"	±0,05	± 0,1	± 0,2	± 0,3
Relative resolution "a"	0,25	0,5	1	1,5

Place: Riedlingen Date: 19.03.2007 Signature: Nacke

Test Certificate

Customer : Servi Motion

Order number/DKD-number: 07/1285

Machine:Typ/Force/No./Year: ALPHA 3-3000 , 3000kN , M.Nr.02643 , 2007

No. of: Display/Trancducer: C20/07020 , P8AP500bar/103410258

Calibrationtemperature: 20,0 ℃ (Room) 20,5 ℃ (Cal ibration Loadcell)

Hardness of pressure plate : 57,5 HRC (Top) 57,3 HRC (down) Flatness plates (Top): O.K

Roughness of pressure plate : 0,55 µm (Top) 0,59 µm (down) Flatness plates (down): O.K

Measure devices	Manufactor	Typ	Serialnumber	Calibrationcertificate	valid
Compression Loadcell :	HBM	KD 3000 4x600	205/4049	BAM-S1 E1642B	Aug.2007
Measureamplifier :	Hottinger	DK 38 S6 S32	20320005	17871 DKD-K-00101 06-09	Nov.2008

Location of machine: Factory

(complete Adress):

Date of test/ Tester : 19.03.07 Nacke

Notes :

Step [kN]	Set value [mV]	Value 1 [mV]	Value 2 [mV]	Value 3 [mV]	Average [mV]	Reversi-bility [mV]	Relative error of accuracy q[%]	Rel. reversibility *v* [%]	Relative repea-tability b[%]	Rel. std-deviat. [type A] A[%]	Rel. display resolut. a[%]
60	0,04712	0,04736	0,04735	0,04732	0,04734	0,04753	-0,46	0,44	0,08	0,03	0,17
150	0,11779	0,11837	0,11841	0,11842	0,11840	0,11818	-0,51	-0,20	0,04	0,01	0,07
300	0,23552	0,23691	0,23701	0,23707	0,23700	0,23598	-0,62	-0,46	0,07	0,02	0,03
600	0,47076	0,47221	0,47207	0,47205	0,47211	0,47091	-0,29	-0,24	0,03	0,01	0,02
900	0,70574	0,70652	0,70662	0,70650	0,70655	0,70589	-0,11	-0,09	0,02	0,01	0,01
1200	0,94044	0,94111	0,94117	0,94106	0,94111	0,94067	-0,07	-0,04	0,01	0,00	0,01
1800	1,40902	1,40996	1,41013	1,41008	1,41006	1,40981	-0,07	-0,02	0,01	0,00	0,01
2400	1,87648	1,87791	1,87809	1,87806	1,87802	1,87856	-0,08	0,03	0,01	0,00	0,00
3000	2,34283	2,34479	2,34502	2,34497	2,34493		-0,09		0,01	0,00	0,00

	Value 1	Value 2	Value 3
Residual display Fio [kN]	0,3000	0,1000	-0,2000
fo [%]	0,01	0	-0,01

This document is not valid any longer after transport or relocation of machine

Acceptable maximum value in %	Class 0,5	Class1	Class2	Class3
Relative error of accuracy "q" :	± 0,5	± 1,0	± 2,0	± 3,0
Relative error of reversibility "*v*" :	±0,75	±1,5	±3,0	±4,5
Relative error of repeatability "b" :	0,5	1,0	2,0	3,0
Relative zero error "fo"	±0,05	± 0,1	± 0,2	± 0,3
Relative resolution "a"	0,25	0,5	1	1,5

Place: Riedlingen Date: 19.03.2007 Signature: Nacke

Test acc. to DIN 51302 part 2

Costumer :	Servi Motion				
Order No.:	07/1285				
Machine (Typ/Force/No./Year):	ALPHA 3-3000 , 3000kN , M.Nr.02643 , 2007				
No. of Display/Trancducer:	C20/07020 , P8AP500bar/103410258				
Calibration temperature:	20,0	C°(Raum)	20,5	℃ (Calibration Loadcell)	
Hardness of pressure plate:	57,5	HRC (top)	57,3	HRC (down)	
Roughness of pressure plate:	0,55	µm (top)	0,59	µm (down)	
Flatness of pressure plate:	O.K	top	O.K	down	
Druckkraftaufnehmer :	Hottinger	KD 2000 4x600		Werk-Nr.	89
Digitalkompensator :	Hottinger	DK 38 S6 S32		Werk-Nr.	20320005
Diameter of force transmitting area:	100	mm			
Measuring range:	2000	kN			
Tester:	Nacke				
Date of test:	19.03.2007				
Remarks:					

1. Test result: Self alignment of the upper pressure plate

	$\overline{R}_n$				
%	M1	M2	M3	M4	allowed
10	0,00	0,02	-0,02	0,00	+/- 0,10
20	0,01	0,01	-0,02	0,01	+/- 0,10
40	0,01	0,00	-0,02	0,01	+/- 0,10
80	0,01	0,00	-0,02	0,02	+/- 0,10
100	0,01	-0,01	-0,02	0,02	+/- 0,10

2. Test result: Alignment of the component parts of the machine

	ΔR_n				
%	M1	M2	M3	M4	allowed
10	0,05	0,05	0,03	0,03	0,10
20	0,02	0,02	0,03	0,03	0,10
40	0,01	0,01	0,02	0,02	0,10
80	0,01	0,01	0,01	0,01	0,10
100	0,01	0,01	0,01	0,01	0,10

3. Test result: Restraint on tilt of the upper pressure plate

%	Wv,h	Wl,r	allowed
10	0,041	-0,041	0,060
20	0,033	-0,033	0,050
40	0,027	-0,026	0,050
80	0,024	-0,023	0,040
100	0,023	-0,022	0,040

Costumer : Servi Motion Servi Motion
Order No.: 07/1285
Machine: ALPHA 3-3000 , 3000kN , M.Nr.02643 , 2007

Serial	%	Measuring values M1 (front)	M2 (back)	M3 (right)	M4 (left)	
1	10	0,1547	0,16449	0,15388	0,1594	Serial 1:
1	20	0,31483	0,32192	0,30839	0,31894	Pressure plate tilted
1	40	0,62972	0,63423	0,61567	0,63739	to **frontside**
1	80	1,26022	1,25491	1,22812	1,27811	
1	100	1,57361	1,56535	1,53373	1,59806	
2	10	0,16246	0,15755	0,15701	0,15766	Serial 2:
2	20	0,32246	0,31534	0,31137	0,31689	Pressure plate tilted
2	40	0,63782	0,62686	0,61891	0,63518	to **backside**
2	80	1,26973	1,24594	1,23146	1,27602	
2	100	1,58412	1,55537	1,53744	1,59566	
3	10	0,1592	0,16208	0,15255	0,16233	Serial 3:
3	20	0,3178	0,32008	0,30627	0,32241	Pressure plate tilted
3	40	0,63288	0,63249	0,61276	0,642	to the **right**
3	80	1,26328	1,25347	1,22365	1,28472	
3	100	1,57736	1,56332	1,52899	1,60526	
4	10	0,15933	0,1595	0,15692	0,15571	Serial 4:
4	20	0,32126	0,3149	0,31348	0,3133	Pressure plate tilted
4	40	0,63661	0,62647	0,6219	0,63041	to the **left**
4	80	1,2686	1,24495	1,23654	1,26871	
4	100	1,58247	1,55458	1,54338	1,58711	
5	10	0,11671	0,20405	0,15528	0,15872	Serial 5:
5	20	0,24911	0,38771	0,31042	0,31671	Loadcell moved
5	40	0,51977	0,74335	0,62017	0,63196	to **frontside**
5	80	1,06546	1,44711	1,24019	1,26365	
5	100	1,33714	1,79816	1,54987	1,57851	
6	10	0,19341	0,12652	0,15547	0,15776	Serial 6:
6	20	0,37212	0,26364	0,30922	0,317	Loadcell moved
6	40	0,72208	0,54024	0,61636	0,63493	to **backside**
6	80	1,42451	1,08742	1,23159	1,27161	
6	100	1,77515	1,3594	1,53931	1,58861	
7	10	0,1575	0,16194	0,11527	0,19905	Serial 7:
7	20	0,31598	0,31995	0,24797	0,3791	Loadcell moved
7	40	0,62901	0,63296	0,52148	0,73032	to the **right**
7	80	1,25339	1,25751	1,06787	1,43472	
7	100	1,56337	1,56895	1,34251	1,78343	
8	10	0,15602	0,16388	0,19362	0,12077	Serial 8:
8	20	0,31241	0,32401	0,37159	0,25603	Loadcell moved
8	40	0,62316	0,64007	0,72063	0,53215	to the **left**
8	80	1,24518	1,26794	1,41592	1,08885	
8	100	1,55497	1,57978	1,76036	1,36809	

Place: Riedlingen Date: 19.03.2007 Signature: Nacke

Prüfprotokoll

test certificate / protocole d`essai

Typ: type / type	DD1	Auftrag: order no / commission	801082906
Nennmessbereich: range / portée	2,5 mm	Prüfer examiner / contrôleur	Bär
IdentNr: serial no / N°- ident	105030018	Datum: test date / date d`essai	15.02.07

Prüfergebnisse:

test results / résultats d`essai

Eingangsgröße des Messbereichs [%] input quantity / échelle d`essai	Ausgangsgröße [mV/V] output quantity / résultats	
	negative Anzeige negative indication / indication négative	positive Anzeige positive indication / indication positive
0	-0.0001	0.0001
50	-1.2475	1.2529
100	-2.4971	2.5044
50	-1.2479	1.2529
0	0.0001	0.0002

Aus den Prüfergebnissen berechnete und sonstige messtechnische Eigenschaften :

metrological characteristics calculated from the measuring results and others
valeurs caractéristiques calculées à partir des résultats d`essai

Kennwert C [mV/V] sensitivity / sensibilité	-2.4970	2.5043
Kennlinienabweichung, Anfangspunkteinstellung [%vC] combined error / erreur combinée	0.03	0.02
Relative Umkehrspanne [%vC] relative hysteresis / hystérésis relatif	0.02	0.00

Allgemeine Zusatzinformationen:

general information / informations complémentaires

Alle weiteren messtechnischen Eigenschaften des Aufnehmers sind durch Typprüfungen und laufende Produktaudits des Qualitätswesens abgesichert.
All other metrological characteristics of the transducer are verified by type testing and regular product audits of the quality department.
Toutes les autres caractéristiques techniques du capteur sont garanties par le Service Qualité, au moyen d`essais et d`audits suivis sur le produit.

Zertifiziert nach ISO 9001 und ISO14001 (DQS-00001)
ISO 9001 and ISO 14001 certified / Certification selon ISO 9001 et ISO 14001

Akkreditiertes DKD Kalibrierlaboratorium und EMV-Prüflaboratorium
Accredited DKD calibration laboratory and EMC testing laboratory
Laboratoire accrédité par le DKD et laboratoire d`essais CEM
DKD-K-00101; DAT-P-006/12

Prüfprotokoll

test certificate / protocole d`essai

Typ: type / type	DD1	Auftrag: order no / commission	801084520
Nennmessbereich: range / portée	2,5 mm	Prüfer examiner / contrôleur	Bär
IdentNr: serial no / N°- ident	105030031	Datum: test date / date d`essai	23.02.07

Prüfergebnisse:

test results / résultats d`essai

Eingangsgröße des Messbereichs [%] input quantity / échelle d`essai	Ausgangsgröße [mV/V] output quantity / résultats	
	negative Anzeige negative indication / indication négative	positive Anzeige positive indication / indication positive
0	0.0004	0.0004
50	-1.2489	1.2514
100	-2.4996	2.5008
50	-1.2487	1.2514
0	0.0004	-0.0001

Aus den Prüfergebnissen berechnete und sonstige messtechnische Eigenschaften :

metrological characteristics calculated from the measuring results and others
valeurs caractéristiques calculées à partir des résultats d`essai

Kennwert C [mV/V] sensitivity / sensibilité	-2.4999	2.5004
Kennlinienabweichung, Anfangspunkteinstellung [%vC] combined error / erreur combinée	0.02	0.02
Relative Umkehrspanne [%vC] relative hysteresis / hystérésis relatif	-0.01	-0.02

Allgemeine Zusatzinformationen:

general information / informations complémentaires

Alle weiteren messtechnischen Eigenschaften des Aufnehmers sind durch Typprüfungen und laufende Produktaudits des Qualitätswesens abgesichert.
All other metrological characteristics of the transducer are verified by type testing and regular product audits of the quality department.
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Laboratoire accrédité par le DKD et laboratoire d`essais CEM
DKD-K-00101; DAT-P-006/12

Prüfprotokoll

test certificate / protocole d`essai

Typ: type / type	DD1	Auftrag: order no / commission	801084520
Nennmessbereich: range / portée	2,5 mm	Prüfer examiner / contrôleur	Bär
IdentNr: serial no / N°- ident	105030032	Datum: test date / date d`essai	23.02.07

Prüfergebnisse:

test results / résultats d`essai

Eingangsgröße des Messbereichs [%] input quantity / échelle d`essai	Ausgangsgröße [mV/V] output quantity / résultats	
	negative Anzeige negative indication / indication négative	positive Anzeige positive indication / indication positive
0	0.0002	0.0003
50	-1.2487	1.2515
100	-2.4980	2.5023
50	-1.2485	1.2514
0	0.0003	0.0000

Aus den Prüfergebnissen berechnete und sonstige messtechnische Eigenschaften :

metrological characteristics calculated from the measuring results and others
valeurs caractéristiques calculées à partir des résultats d`essai

Kennwert C [mV/V] sensitivity / sensibilité	-2.4982	2.5020
Kennlinienabweichung, Anfangspunkteinstellung [%vC] combined error / erreur combinée	0.01	0.01
Relative Umkehrspanne [%vC] relative hysteresis / hystérésis relatif	-0.01	-0.01

Allgemeine Zusatzinformationen:

general information / informations complémentaires

Alle weiteren messtechnischen Eigenschaften des Aufnehmers sind durch Typprüfungen und laufende Produktaudits des Qualitätswesens abgesichert.
All other metrological characteristics of the transducer are verified by type testing and regular product audits of the quality department.
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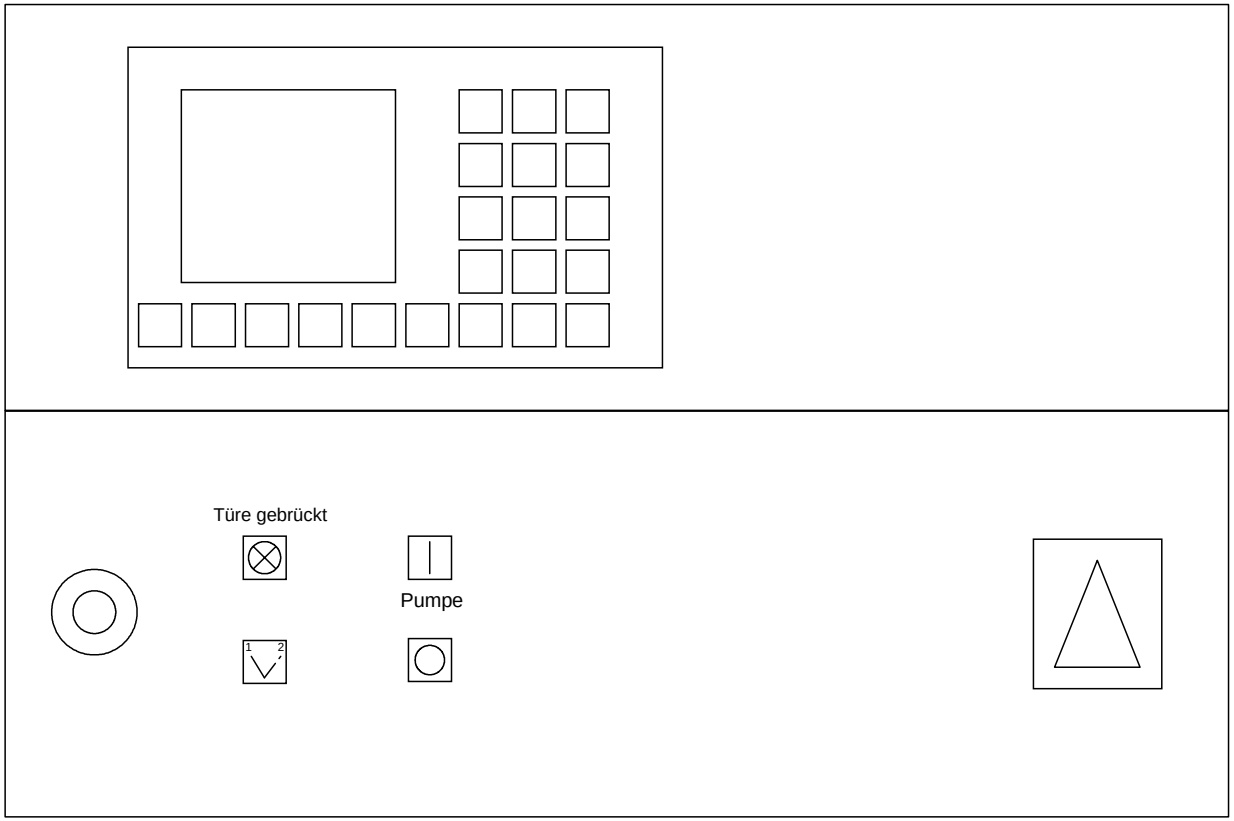
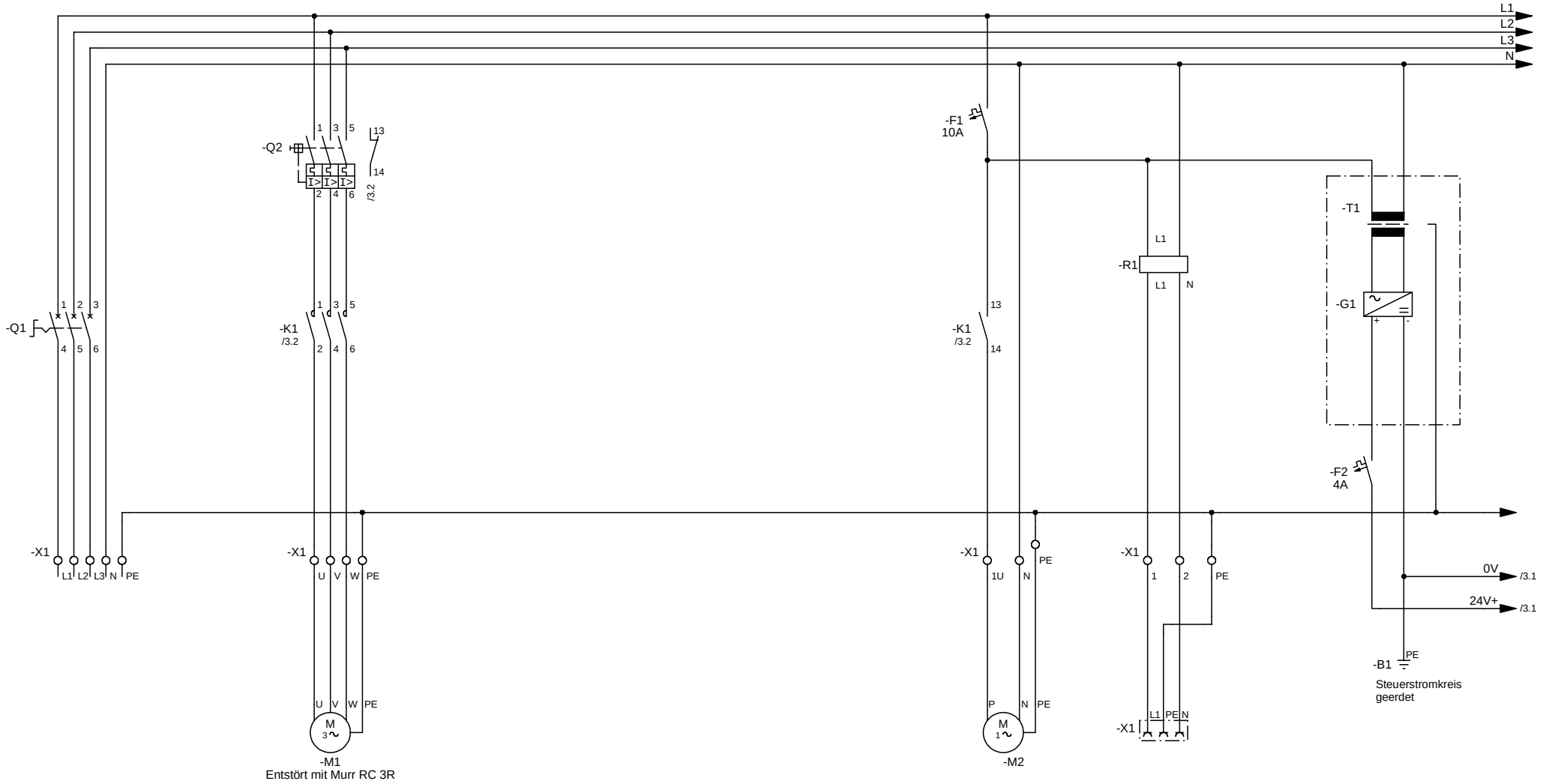
DKD-K-00101; DAT-P-006/12

Hottinger Baldwin Messtechnik GmbH **Im Tiefen See 45** **D-64293 Darmstadt**

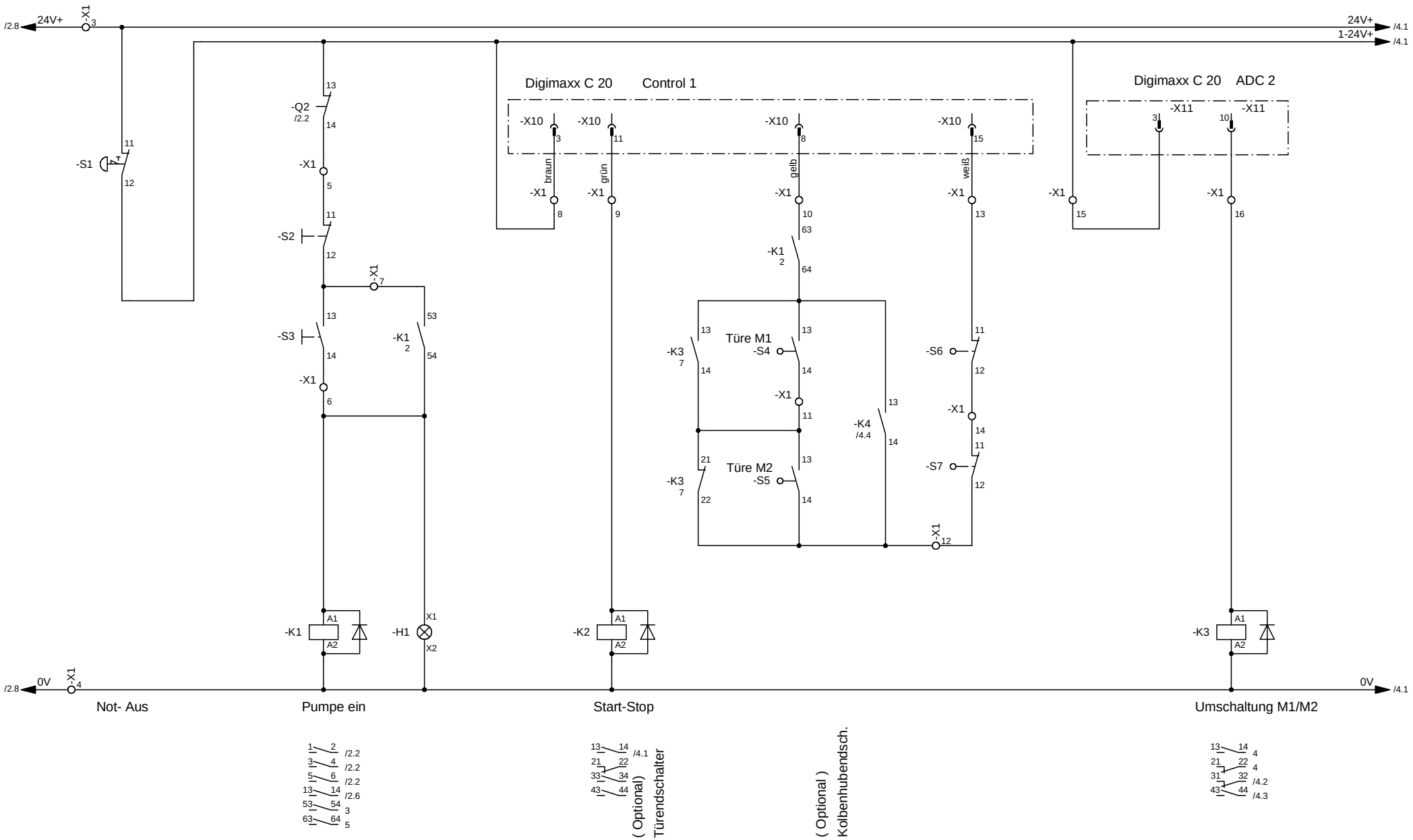
Ausgabe 16614 Version a
12.04.2005 Moor
115.00-1413PP



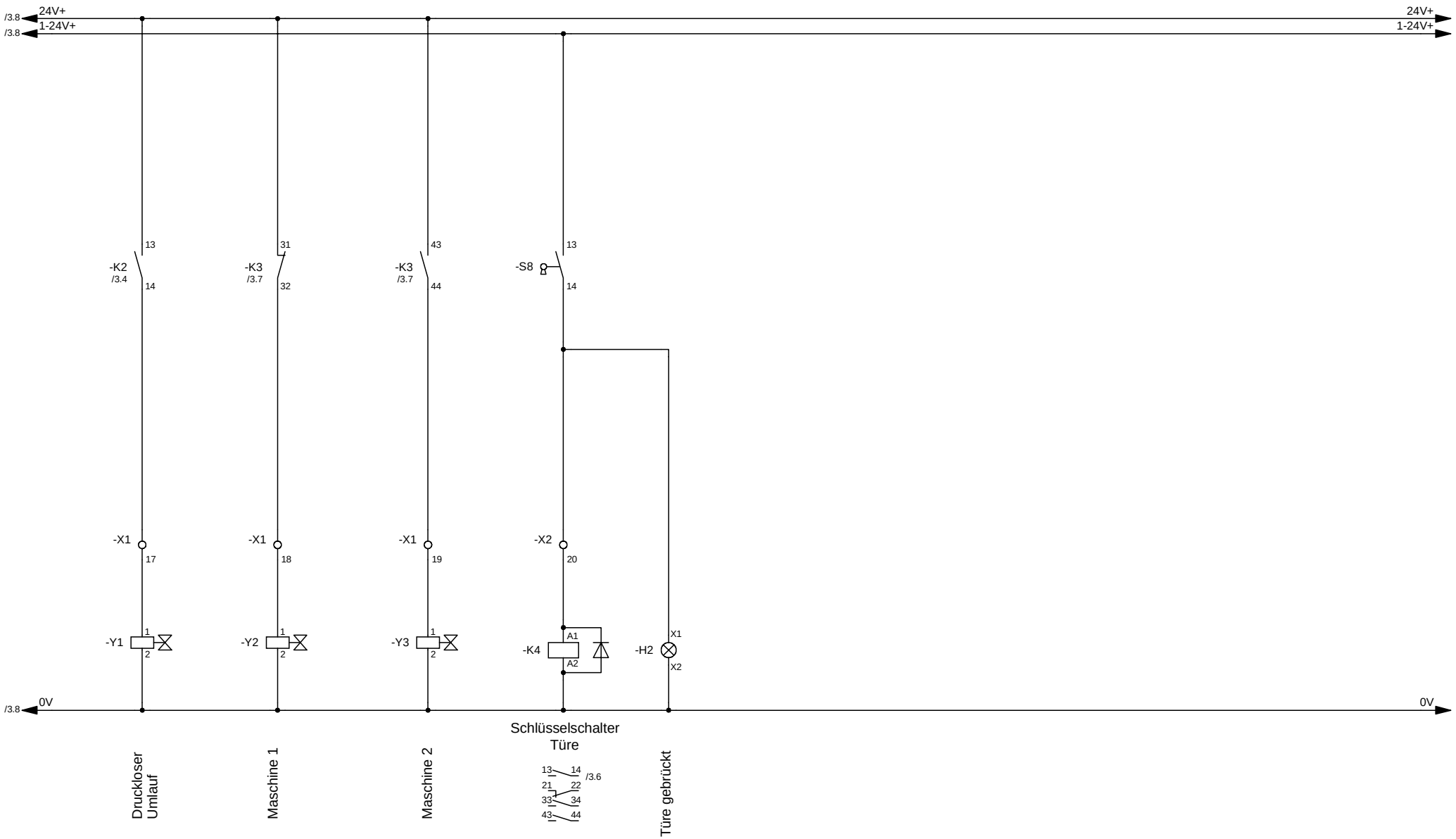
		27.03.2006	Zoll	Datum	11.02.2004	FORM+TEST PRÜFSYSTEME	Allgemein	C-20, 2 Maschinen, m. Pumpe Ein/Aus, Magnet, Schlüsselschalter Deckblatt		Anlage: A1	
				Bearb.	Zoll					Ort SCH	
				Gepr.							
Zustand	Änderung	Datum	Name	Norm		Urspr.	Ers. für	Ers. durch		E-3\300E3031-1	Blatt-Nr. 1 / Bl von Anz 1/4



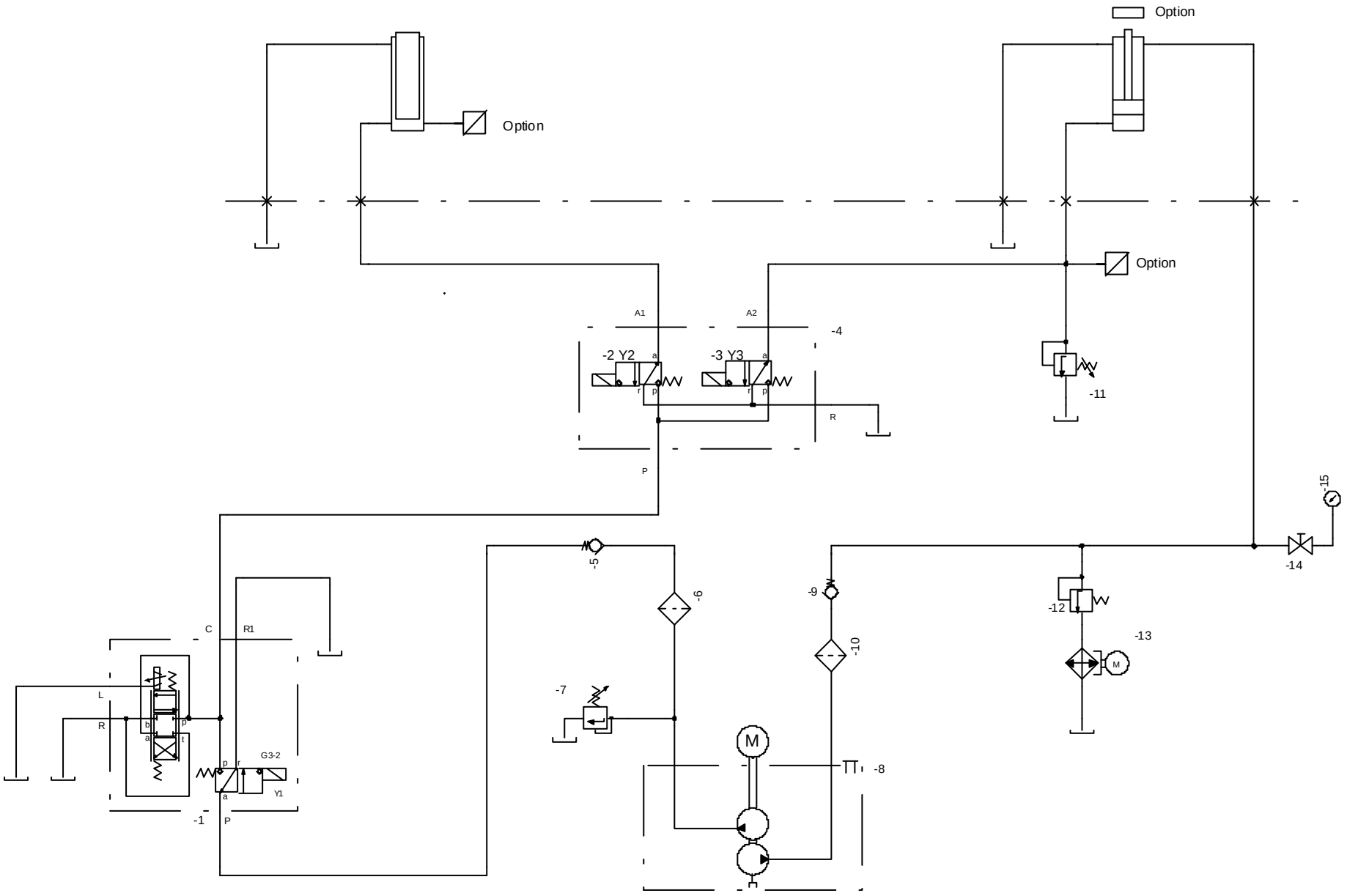
		21.03.2006	Zoll	Datum	11.02.2004	FORM+TEST PRÜFSYSTEME	Allgemein	C-20, 2 Maschinen, m. Pumpe Ein/Aus, Magnet, Schlüsselschalter Leistungsteil	Anlage: A1	
				Bearb.	Zoll				Ort SCH	
				Gepr.					E-3\300E3031-1	Blatt-Nr. 2
Zustand	Änderung	Datum	Name	Norm		Urspr.	Ers. für	Ers. durch		Bl von Anz 2/4



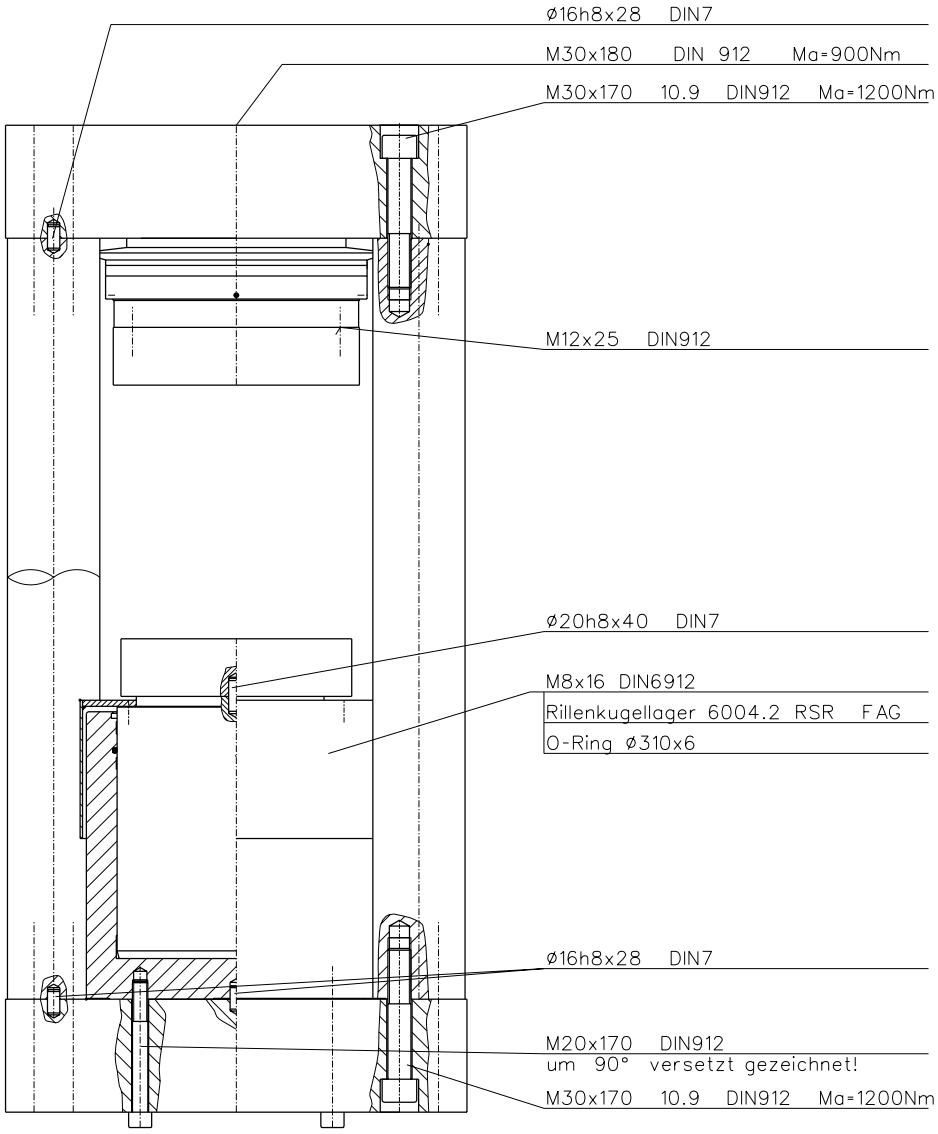
		21.03.2006	Zoll	Datum	11.02.2004	FORM+TEST PRÜFSYSTEME	Allgemein	C-20, 2 Maschinen, m. Pumpe Ein/Aus, Magnet, Schlüsselschalter Steuerungsteil	Anlage: A1	
				Bearb.	Zoll				Ort SCH	
				Gepr.					E-3\300E3031-1	Blatt-Nr. 3
Zustand	Änderung	Datum	Name	Norm		Urspr.	Ers. für	Ers. durch		Bl von Anz 3/4



		21.03.2006	Zoll	Datum	11.02.2004	FORM+TEST PRÜFSYSTEME	Allgemein	C-20, 2 Maschinen, m. Pumpe Ein/Aus, Magnet, Schlüsselschalter Steuerungsteil		Anlage: A1	
				Bearb.	Zoll					Ort SCH	
				Gepr.						E-3\300E3031-1	Blatt-Nr. 4
Zustand	Änderung	Datum	Name	Norm		Urspr.	Ers. für	Ers. durch			Bl von Anz 4/4



		17.02.2004	Zoll	Datum	10.11.2000	FORM+TEST PRÜFSYSTEME	Allgemein	2 Maschinen, Magnetumsch., Gegendruck		Anlage: A1	
				Bearb.	Stöhr					Ort Schaltschrank	
				Gepr.				Hydraulikschema		Blatt-Nr. 1	
Zustand	Änderung	Datum	Name	Norm		Urspr.	Ers. für	Ers. durch	H-3\300H1040	Bl von Anz 1/1	



FORM+TEST PRÜFSYSTEME
Zwiefalter Str.20-D-88499 Riedlingen

Weitergabe sowie Vervielfältigung dieser Unterlage ist nicht gestattet.
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Zust.	Änderung	Datum	Name
		2000	Datum / Name
		Bearb.	25.07 Biersch
		Gepr.	25.07
		Norm	

Werkstoff

Oberflächen nach DIN ISO 1302

M. ohne Toleranzangabe nach DIN ISO 2768 m

M.-stab 1:5

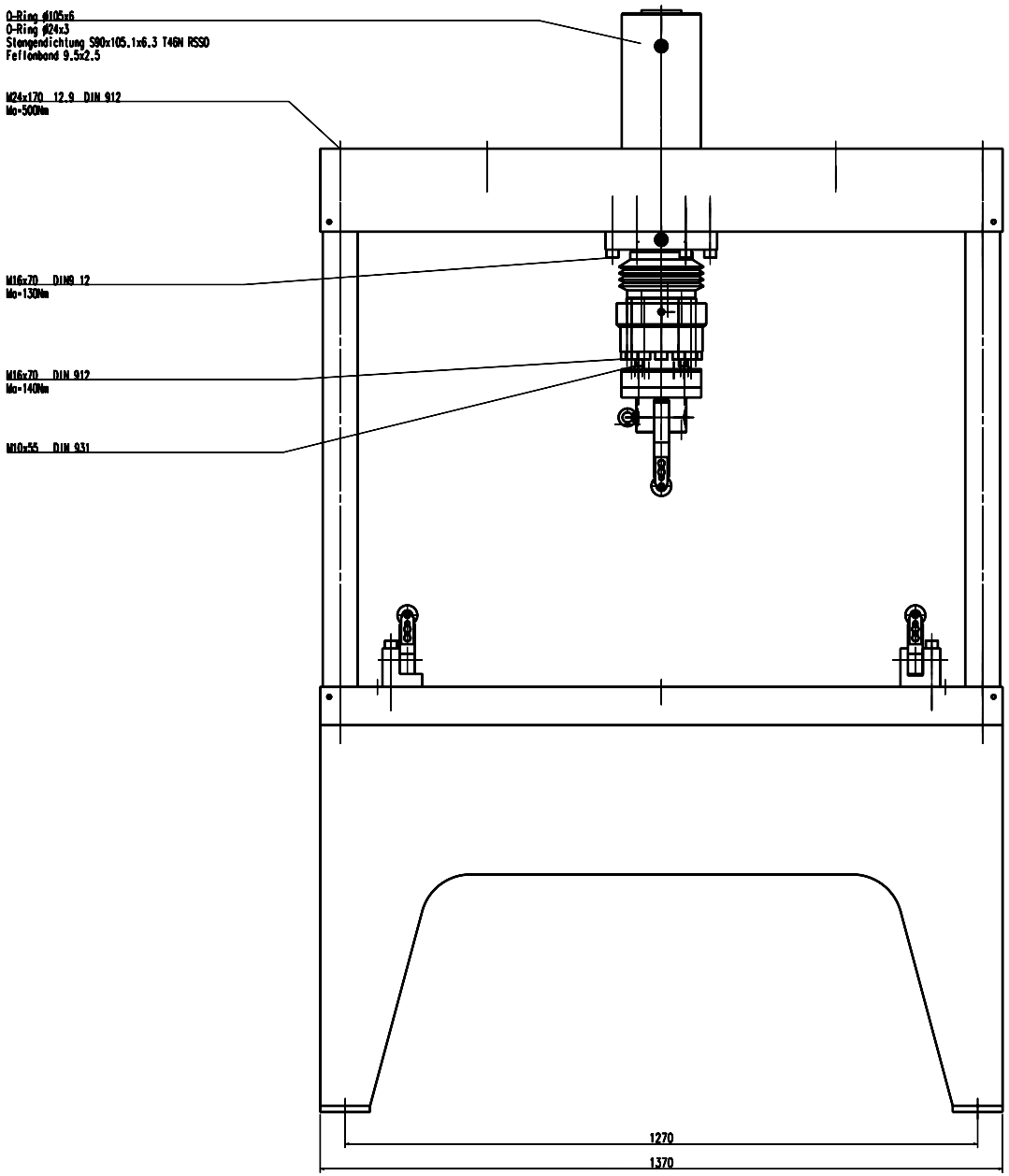
Stück

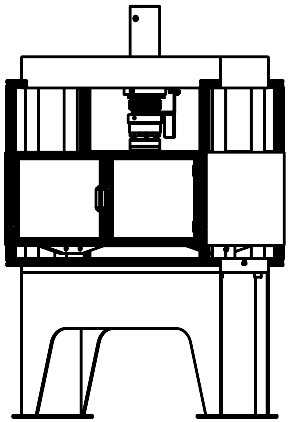
ALPHA 3-3000

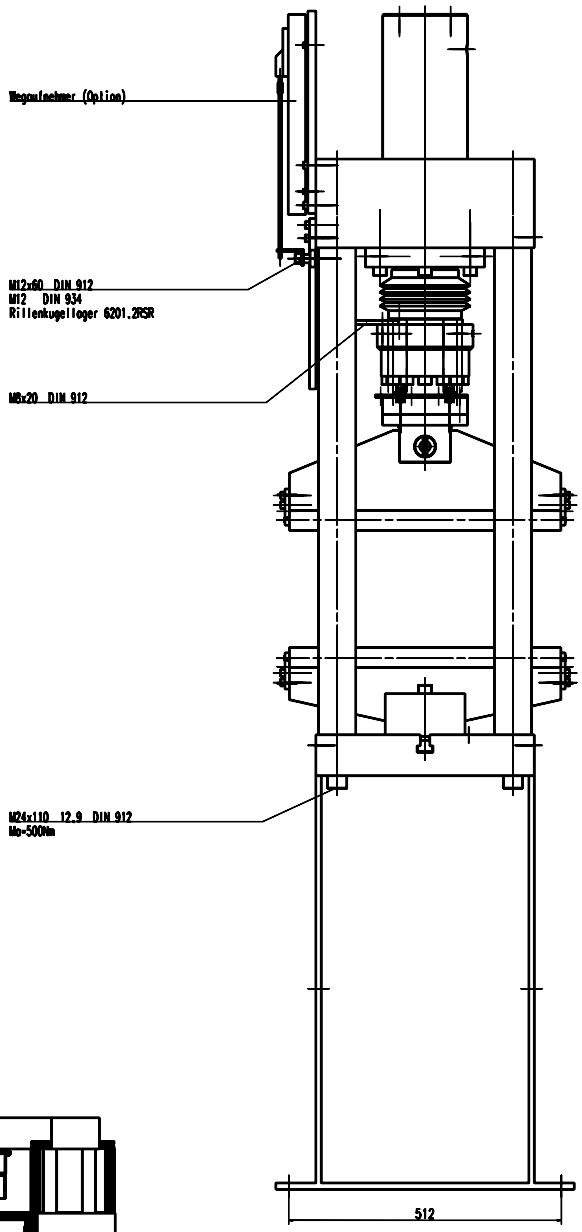
EL 08 3000 25 2/3

Blatt

Bl.


O-Ring ø105x6
O-Ring ø24x3
Stangendichtung S80x105.1x6.3 T46N RSSO
Fettonband 9.5x2.5
M24x170 12.9 DIN 912
Ma=500Nm
M16x70 DIN9 12
Ma=130Nm
M16x70 DIN 912
Ma=140Nm
M10x55 DIN 931
1270
1370




Wegaufnehmer (Option)
M12x60 DIN 912
M12 DIN 934
Rillenkugellager 6201.2RSR
M8x20 DIN 912
M24x110 12.9 DIN 912
Ma=500Nm
512

| | | |

Konformitätsbescheinigung/Conformity certificate

FORM+TEST PRÜFSYSTEME

BA

Die Konformitätsbescheinigung zu Ihrer Prüfmaschine wird Ihnen in einer separaten E-Mail zugesandt.

The conformity certificate for your test-machine will be sent to you in a separate E-Mail.